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Northeastern College

January 1922

CATALOG

of the

School of Engineering

1922-1923

NORTHEASTERN COLLEGE

Boston Young Men's Christian Association

Number 316 Huntington Ave., Boston, Massachusetts

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ASSOCIATION BUILDING
NORTHEASTERN COLLEGE
(MAIN BUILDING)

Northeastern College

CATALOG

of the

School of Engineering

Co-operative Plan

1922-1923

NORTHEASTERN COLLEGE
Boston Young Men's Christian Association

YEARLY CALENDAR

of School Sessions

1922

JANUARY

S	M	T	W	T	F	S
1	*2*	**3**	**4**	**5**	**6**	**7**
8	**9**	**10**	**11**	**12**	**13**	**14**
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28**
29	**30**	**31**	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

FEBRUARY

S	M	T	W	T	F	S
. .	. .	. .	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

MARCH

S	M	T	W	T	F	S
. .	. .	. .	1	2	3	4
5	**6**	**7**	**8**	**9**	**10**	**11**
12	**13**	**14**	**15**	**16**	**17**	**18**
19	**20**	**21**	**22**	**23**	**24**	**25**
26	**27**	**28**	**29**	**30**	**31**	. .
. .	. .	. .	. .	. .	. .	. .

APRIL

S	M	T	W	T	F	S
. .	. .	. .	. .	. .	. .	**1**
2	**3**	**4**	**5**	*6*	*7*	*8*
9	10	11	12	13	14	15
16	*17*	*18*	*19*	20	21	22
23	24	25	26	27	28	29
30	. .	. .	. .	. .	. .	. .

MAY

S	M	T	W	T	F	S
. .	1	2	3	4	5	6
7	8	9	10	11	12	13
14	**15**	**16**	**17**	**18**	**19**	**20**
21	**22**	**23**	**24**	**25**	**26**	**27**
28	*29*	*30*	**31**	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

JUNE

S	M	T	W	T	F	S
. .	. .	. .	. .	1	2	3
4	**5**	**6**	**7**	**8**	**9**	**10**
11	**12**	**13**	**14**	**15**	**16**	*17*
18	19	20	21	22	23	24
25	26	27	28	29	30	. .
. .	. .	. .	. .	. .	. .	. .

JULY

S	M	T	W	T	F	S
. .	. .	. .	. .	. .	. .	1
2	3	*4*	5	6	7	8
9	*10*	*11*	*12*	*13*	*14*	*15*
16	*17*	*18*	*19*	20	21	22
23	*24*	*25*	26	27	28	29
30	*31*	. .	. .	. .	. .	. .

AUGUST

S	M	T	W	T	F	S
. .	. .	*1*	*2*	*3*	*4*	*5*
6	*7*	*8*	*9*	*10*	*11*	*12*
13	*14*	*15*	*16*	*17*	*18*	*19*
20	**21**	**22**	**23**	**24**	**25**	**26**
27	**28**	**29**	**30**	**31**	. .	. .
. .	. .	. .	. .	. .	. .	. .

SEPTEMBER

S	M	T	W	T	F	S
. .	. .	. .	. .	. .	**1**	**2**
3	*4*	**5**	**6**	**7**	**8**	**9**
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
. .	. .	. .	. .	. .	. .	. .

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	*12*	13	14
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28**
29	**30**	**31**	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

NOVEMBER

S	M	T	W	T	F	S
. .	. .	. .	**1**	**2**	**3**	**4**
5	**6**	**7**	**8**	**9**	**10**	**11**
12	**13**	**14**	**15**	**16**	**17**	**18**
19	20	21	22	23	24	25
26	27	28	29	*30*	. .	. .
. .	. .	. .	. .	. .	. .	. .

DECEMBER

S	M	T	W	T	F	S
. .	. .	. .	. .	. .	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	*22*	*23*
24	*25*	*26*	**27**	**28**	**29**	**30**
31	. .	. .	. .	. .	. .	. .

1923

JANUARY

S	M	T	W	T	F	S
. .	*1*	**2**	**3**	**4**	**5**	**6**
7	**8**	**9**	**10**	**11**	**12**	**13**
14	**15**	**16**	**17**	**18**	**19**	**20**
21	**22**	**23**	**24**	**25**	**26**	**27**
28	29	30	31	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

FEBRUARY

S	M	T	W	T	F	S
. .	. .	. .	. .	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

MARCH

S	M	T	W	T	F	S
. .	. .	. .	. .	1	2	3
4	**5**	**6**	**7**	**8**	**9**	**10**
11	**12**	**13**	**14**	**15**	**16**	**17**
18	**19**	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**	**31**
. .	. .	. .	. .	. .	. .	. .

APRIL

S	M	T	W	T	F	S
1	**2**	**3**	**4**	*5*	6	*7*
8	9	10	11	12	13	14
15	16	17	18	*19*	*20*	*21*
22	23	24	25	26	27	28
29	30	. .	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

MAY

S	M	T	W	T	F	S
. .	. .	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	**21**	**22**	**23**	**24**	**25**	**26**
27	**28**	**29**	*30*	**31**	. .	. .
. .	. .	. .	. .	. .	. .	. .

JUNE

S	M	T	W	T	F	S
. .	. .	. .	. .	. .	1	2
3	**4**	**5**	**6**	**7**	8	9
10	**11**	**12**	**13**	**14**	**15**	**16**
17	*18*	19	20	21	22	23
24	25	26	27	28	29	30
. .	. .	. .	. .	. .	. .	. .

JULY

S	M	T	W	T	F	S
1	2	3	*4*	5	6	7
8	*9*	*10*	*11*	*12*	*13*	*14*
15	*16*	*17*	*18*	*19*	20	*21*
22	*23*	*24*	*25*	26	27	*28*
29	*30*	*31*	. .	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

AUGUST

S	M	T	W	T	F	S
. .	. .	. .	*1*	2	*3*	*4*
5	6	*7*	*8*	*9*	*10*	*11*
12	*13*	*14*	*15*	*16*	*17*	*18*
19	*20*	**21**	**22**	**23**	**24**	**25**
26	**27**	**28**	**29**	**30**	**31**	. .
. .	. .	. .	. .	. .	. .	. .

SEPTEMBER

S	M	T	W	T	F	S
. .	. .	. .	. .	. .	. .	1
2	*3*	**4**	**5**	**6**	**7**	**8**
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	. .	. .	. .	. .	. .	. .

OCTOBER

S	M	T	W	T	F	S
. .	1	2	3	4	5	6
7	8	9	10	11	*12*	13
14	**15**	**16**	**17**	**18**	**19**	**20**
21	**22**	**23**	**24**	**25**	**26**	**27**
28	**29**	**30**	**31**	. .	. .	. .
. .	. .	. .	. .	. .	. .	. .

NOVEMBER

S	M	T	W	T	F	S
. .	. .	. .	. .	**1**	**2**	**3**
4	**5**	**6**	**7**	**8**	**9**	**10**
11	**12**	**13**	**14**	**15**	**16**	**17**
18	19	20	21	22	23	24
25	26	27	28	29	30	. .
. .	. .	. .	. .	. .	. .	. .

DECEMBER

S	M	T	W	T	F	S
. .	. .	. .	. .	. .	. .	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	*25*	**26**	**27**	**28**	**29**
30	**31**	. .	. .	. .	. .	. .

School Periods for Division A indicated by type thus: 1 2 3.
School Periods for Division B indicated by type thus: **1 2 3.**
Periods when School is not in session indicated by type thus: *1 2 3.*

YEARLY CALENDAR

of Engineering Practice Periods for Upper-Classmen

1922

JANUARY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	**30**	**31**	.	.	.	.
.	.	.	.	.	.	.

FEBRUARY

S	M	T	W	T	F	S
.	.	.	1	2	3	4
5	**6**	**7**	**8**	**9**	**10**	**11**
12	**13**	**14**	**15**	**16**	**17**	**18**
19	**20**	**21**	*22*	**23**	**24**	**25**
26	**27**	**28**	.	.	.	.
.	.	.	.	.	.	.

MARCH

S	M	T	W	T	F	S
.	.	.	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	.
.	.	.	.	.	.	.

APRIL

S	M	T	W	T	F	S
.	.	.	.	.	.	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	**24**	**25**	**26**	**27**	**28**	**29**
30	.	.	.	.	.	.

MAY

S	M	T	W	T	F	S
.	**1**	**2**	**3**	**4**	**5**	**6**
7	**8**	**9**	**10**	**11**	**12**	**13**
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	*30*	31	.	.	.
.	.	.	.	.	.	.

JUNE

S	M	T	W	T	F	S
.	.	.	.	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	**19**	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**	.
.	.	.	.	.	.	.

JULY

S	M	T	W	T	F	S
.	.	.	.	.	.	1
2	**3**	*4*	5	6	7	8
9	**10**	**11**	**12**	**13**	**14**	**15**
16	**17**	**18**	**19**	**20**	**21**	**22**
23	**24**	**25**	**26**	**27**	**28**	**29**
30	31	.	.	.	.	.

AUGUST

S	M	T	W	T	F	S
.	.	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	.	.
.	.	.	.	.	.	.

SEPTEMBER

S	M	T	W	T	F	S
.	.	.	.	.	1	2
3	*4*	5	6	7	8	9
10	**11**	**12**	**13**	**14**	**15**	**16**
17	**18**	**19**	**20**	**21**	**22**	**23**
24	**25**	**26**	**27**	**28**	**29**	**30**
.	.	.	.	.	.	.

OCTOBER

S	M	T	W	T	F	S
1	**2**	**3**	**4**	5	**6**	**7**
8	**9**	**10**	**11**	*12*	**13**	**14**
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	.	.	.	.
.	.	.	.	.	.	.

NOVEMBER

S	M	T	W	T	F	S
.	.	.	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	**20**	**21**	**22**	**23**	**24**	**25**
26	**27**	**28**	**29**	*30*	.	.
.	.	.	.	.	.	.

DECEMBER

S	M	T	W	T	F	S
.	.	.	.	.	**1**	**2**
3	**4**	**5**	**6**	**7**	**8**	**9**
10	**11**	**12**	**13**	**14**	**15**	**16**
17	**18**	**19**	**20**	**21**	**22**	**23**
24	*25*	26	27	28	29	30
31	.	.	.	.	.	.

1923

JANUARY

S	M	T	W	T	F	S
.	*1*	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	**29**	**30**	**31**	.	.	.
.	.	.	.	.	.	.

FEBRUARY

S	M	T	W	T	F	S
.	.	.	.	**1**	**2**	**3**
4	**5**	**6**	**7**	**8**	**9**	**10**
11	**12**	**13**	**14**	**15**	**16**	**17**
18	**18**	**20**	**21**	*22*	**23**	**24**
25	**26**	**27**	**28**	.	.	.
.	.	.	.	.	.	.

MARCH

S	M	T	W	T	F	S
.	.	.	.	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
.	.	.	.	.	.	.

APRIL

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	**9**	**10**	**11**	**12**	**13**	**14**
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	**28**
29	**30**	.	.	.	.	.
.	.	.	.	.	.	.

MAY

S	M	T	W	T	F	S
.	.	**1**	**2**	**3**	**4**	**5**
6	**7**	**8**	**9**	**10**	**11**	**12**
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	*30*	31	.	.
.	.	.	.	.	.	.

JUNE

S	M	T	W	T	F	S
.	.	.	.	.	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	**18**	**19**	**20**	**21**	**22**	**23**
24	**25**	**26**	**27**	**28**	**29**	**30**
.	.	.	.	.	.	.

JULY

S	M	T	W	T	F	S
1	**2**	**3**	*4*	**5**	**6**	**7**
8	**9**	**10**	**11**	**12**	**13**	**14**
15	**16**	**17**	**18**	**19**	**20**	**21**
22	**23**	**24**	**25**	**26**	**27**	28
29	30	31	.	.	.	.
.	.	.	.	.	.	.

AUGUST

S	M	T	W	T	F	S
.	.	.	.	**1**	**2**	**3**
4	**5**	**6**	**7**	**8**	**9**	**10**
11	**12**	**13**	**14**	**15**	**16**	**17**
18	**18**	**20**	**21**	*22*	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**	**31**
.	.	.	.	.	.	.

SEPTEMBER

S	M	T	W	T	F	S
.	.	.	.	.	.	1
2	*3*	4	5	6	7	8
9	**10**	**11**	**12**	**13**	**14**	**15**
16	**17**	**18**	**19**	**20**	**21**	**22**
23	**24**	**25**	**26**	**27**	**28**	**29**
30	.	.	.	.	.	.

OCTOBER

S	M	T	W	T	F	S
.	**1**	**2**	**3**	**4**	**5**	**6**
7	**8**	**9**	**10**	**11**	*12*	**13**
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	.	.	.
.	.	.	.	.	.	.

NOVEMBER

S	M	T	W	T	F	S
.	.	.	.	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	**19**	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	*29*	**30**	.
.	.	.	.	.	.	.

DECEMBER

S	M	T	W	T	F	S
.	.	.	.	.	.	**1**
2	**3**	**4**	**5**	**6**	**7**	**8**
9	**10**	**11**	**12**	**13**	**14**	**15**
16	**17**	**18**	**19**	**20**	**21**	**22**
23	24	*25*	26	27	28	29
30	31	.	.	.	.	.

Engineering Practice Periods for Division A indicated by type thus: 1 2 3.
Engineering Practice Periods for Division B indicated by type thus: **1 2 3.**
Sundays and Holidays indicated by type thus: *1 2 3.*

CALENDAR, 1922-1923

General Notes

Division B is at Engineering Practice while Division A is at school.

Division A is at Engineering Practice while Division B is at school.

Periods at school or at Engineering Practice are shown by different kinds of type on Yearly Calendars.

First-year students co-operate on the twenty-week plan.

Students above the first year co-operate on the five-week plan.

All Engineering Practice periods for upperclassmen are of five weeks' duration, except in summer, when one period for each division is six weeks.

All students while at Engineering Practice have no holidays except those regularly allowed by employing firms.

Special Notes for 1922

June 19–July 29 Division B at Engineering Practice.

July 31–September 9 Division A at Engineering Practice.

July 10–July 29 Summer Vacation for Division A.

July 31–August 19 Summer Vacation for Division B.

CALENDAR, 1922

January 2, Monday
Observance of New Year's Day (School exercises omitted)

January 19, Thursday
Entrance examinations

January 30, Monday
Third Period (Second Semester) begins for Division A Upperclassmen
Opening of First Semester for Division B Freshmen

February 22, Wednesday
Washington's Birthday (School exercises omitted)

March 6, Monday
Third Period (Second Semester) begins for Division B Upperclassmen
Second Period begins for Division B Freshmen

April 6–7–8, Thursday, Friday, Saturday
School exercises omitted

April 10, Monday
Fourth Period begins for Division A Upperclassmen
Third Period (Second Semester) begins for Division B Freshmen

April 17–18, Monday, Tuesday
School exercises omitted

Calendar, 1922-1923

(Continued)

April 19, Wednesday
Patriot's Day (School exercises omitted)

May 15, Monday
Fourth Period begins for Division B

May 29, Monday
School exercises omitted

May 30, Tuesday
Memorial Day (School exercises omitted)

June 15, Thursday
Entrance examinations

June 17, Saturday
Bunker Hill Day (School exercises omitted)

June 18, Sunday
Baccalaureate Sermon

June 19, Monday
Summer Term begins for Division A Upperclassmen
Summer Term begins for Division B Freshmen

June 21, Wednesday
Annual Commencement

July 4, Tuesday
Independence Day (School exercises omitted)

August 21, Monday
Summer Term begins for Division B Upperclassmen
Summer Term begins for Division A Freshmen

September 4, Monday
Labor Day (School exercises omitted)

September 7, Thursday
Entrance examinations

September 11, Monday
Opening of the First Semester for Division A

October 12, Thursday
Columbus Day (School exercises omitted)

October 16, Monday
Opening of the First Semester for Division B Upperclassmen
Second Period begins for Division A Freshmen

November 20, Monday
Second Period begins for Division A Upperclassmen
Third Period (Second Semester) begins for Division A Freshmen

November 30, Thursday
Thanksgiving Day (School exercises omitted)

December 22–26, Thursday–Monday, inclusive
Christmas Recess

December 27, Tuesday
Second Period begins for Division B. Upperclassmen
Fourth Period begins for Division A Freshmen

Calendar, 1922-1923

(Continued)

Special Notes for 1923

June 18–July 28 Division B at Engineering Practice

July 30–September 8 Division A at Engineering Practice

July 9–July 28 Summer Vacations for Division A

July 30–August 18 Summer Vacations for Division B

CALENDAR, 1923

January 1, Monday
New Year's Day (School exercises omitted)

January 18, Thursday
Entrance Examinations

January 29, Monday
Opening of the First Semester for Division B Freshmen
Third Period (Second Semester) begins for Division A Upperclassmen

February 22, Thursday
Washington's Birthday (School exercises omitted)

March 5, Monday
Third Period (Second Semester) begins for Division B Upperclassmen
Second Period begins for Division B Freshmen

April 5, 6, 7, Thursday, Friday, Saturday
School exercises omitted

April 9, Monday
Fourth Period begins for Division A Upperclassmen
Third Period (Second Semester) begins for Division B Freshmen

April 19, Thursday
Patriot's Day (School exercises omitted)

April 20, 21 Friday, Saturday
School exercises omitted

May 14, Monday
Fourth Period begins for Division B

May 30, Wednesday
Memorial Day (School exercises omitted)

June 14, Thursday
Entrance Examinations

Calendar, 1922-1923

(Continued)

June 17, Sunday
Baccalaureate Sermon

June 18, Monday
Observance of Bunker Hill Day (School exercises omitted)

June 19, Tuesday
Summer Term begins for Division A Upperclassmen
Summer Term begins for Division B Freshmen

June 20, Wednesday
Annual Commencement

July 4, Wednesday
Independence Day (School exercises omitted)

August 21, Tuesday
Summer Term begins for Division B Upperclassmen
Summer Term begins for Division A Freshmen

September 3, Monday
Labor Day (School exercises omitted)

September 6, Thursday
Entrance Examinations

September 10, Monday
Opening of the First Semester for Division A

October 12, Friday
Columbus Day (School exercises omitted)

October 13, Saturday
School exercises omitted

October 15, Monday
Opening of First Semester for Division B Upperclassmen
Second Period begins for Division A Freshmen

November 19, Monday
Second Period begins for Division A Upperclassmen
Third Period (Second Semester) begins for Division A Freshmen

November 29, Thursday
Thanksgiving Day (School exercises omitted)

December 24, Monday
School exercises omitted

December 25, Tuesday
Christmas Day (School exercises omitted)

December 26, Wednesday
Second Period begins for Division B Upperclassmen
Fourth Period begins for Division A Freshmen

Northeastern College

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Northeastern College
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Northeastern College

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(Continued)

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Ernest Fred Perkins, S.B., M.S. *Instructor in Chemical Engineering*	153 East Emerson St., Melrose
Roland Guyer Porter, B.E.E. *Instructor in Electrical Engineering*	317 Common St., Watertown
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John James Sinnett *Instructor in Physical Training*	24 Bardwell St., Jamaica Plain
Frederick Arlington Stearns, S.B. *Instructor in Mechanical Engineering*	208 Grove St., Melrose

Northeastern College

FACULTY OF THE SCHOOL

(Continued)

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Arthur Edward Harding *Assistant in Civil Engineering*	111 Gainsborough St., Boston
Edward Snow Parsons *Assistant in Civil Engineering*	705 Washington St., Gloucester
Robert Fletcher Reed *Assistant in Physics*	Granville Ferry, Nova Scotia
Charles Clifton Russell, Jr. *Assistant in Electrical Engineering*	21 Eliot St., Quincy
Henry Philip Shopneck *Assistant in Chemistry*	100 Woodward Ave., Dorchester
Benjamin Lincoln Smith *Assistant in Electrical Engineering*	4 Academy Lane, Concord
George Henry Wetmore *Assistant in Physics*	15 Glendale St., Peabody

Northeastern College

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Northeastern College

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Professor Pugsley, in charge

Engineering Practice
Professor Nightingale, in charge

Student Activities
Professor Spear, in charge

PROFESSIONAL DEPARTMENTS

Civil Engineering
Professor Alvord, in charge

Mechanical Engineering
Professor Zeller, in charge

Electrical Engineering
Professor Smith, in charge

Chemical Engineering
Professor Strahan, in charge

GENERAL DEPARTMENTS

Drawing
Professor Ashley in charge,

English
Professor Melvin, in charge

Mathematics
Professor Spear, in charge

Physics
Professor Coolidge, in charge

Northeastern College

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1922-1923

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Professor Spear

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Northeastern College

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"A Man and His Job"

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Rector of Center Methodist Episcopal Church, Malden, Mass.
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"A Useful and Enjoyable Life"

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RALPH B. WILSON
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"Business Conditions"

THE LOBBY

Students in Class Work

Class in Mechanical Drawing
NORTHEASTERN COLLEGE

Class in Surveying Fieldwork
NORTHEASTERN COLLEGE

GENERAL INFORMATION

History of Northeastern College

The incorporation of Northeastern College of the Boston Young Men's Christian Association in March, 1916, marked the culmination of a notable development. The College is not a new institution, but the realization of an ideal carefully worked out and persistently followed for a period of many years.

The Boston Young Men's Christian Association, established in 1851, had, as one of its first lines of endeavor, evening classes for young men. It was not, however, until 1896 that the evening school system was placed upon a permanent basis with expert supervision. As courses were being offered in increasingly large numbers, it became evident that a more complete organization should be effected, with the result that the courses were grouped as separate schools, such additional courses being offered as would complete the curriculums of the several schools.

The School of Law, established in 1898, was incorporated in 1904 with degree granting power. The School of Commerce and Finance, founded in 1907, was incorporated in 1911, with the right to grant the Bachelor and Master of Commercial Science degrees. The School of Engineering was opened in 1909, and received in 1920 the right to grant the following degrees: Bachelor of Civil Engineering, Bachelor of Mechanical Engineering, Bachelor of Electrical Engineering, and Bachelor of Chemical Engineering. Affiliated with the College are the Evening Polytechnic School, the Huntington School for Boys, and the Northeastern Preparatory School.

In the thirteen years that have elapsed, the school, which was started with no special educational requirements for entering students, and which had but little equipment and a registration of only eight pupils, has grown to be a recognized factor in the community, with rigid requirements of scholarship and character for entering students, thousands of dollars' worth of equipment, a highly-trained and able faculty, and an enrollment of over eight hundred students. It is enabling the young man of moderate financial ability to get a college engineering training and at the same time not only to defray

his own expenses, but also to become familiar with the actual practice of his profession.

Object of the School

Technical school instruction, depending on class-room work and laboratories, must always lack some of the vital characteristics of an actual manufacturing plant. One is carried on for educational purposes, while the other is operated for dividends. It is this latter fact that gives the co-operative school idea one great advantage over the usual educational plan. Instead of training the student for several years for work in which he may later find himself entirely unfitted, the School puts the student to work in a commercial plant. There he learns life in its vital issues, as well as the problem of getting along with men, thus early finding out whether he has made a wise or unwise choice of his life work. This training shows him the use and value of his school work, and finally gives him an unusual opportunity to acquire from actual experience that rare characteristic, *executive ability*, without which his life probably would be spent on the lower levels of industry.

The fundamental aim of this School is to give young men sound training in both the theoretical and practical principles upon which professional practice is based. Thus they are enabled to advance farther and more rapidly in their chosen work than they could expect to do without further education than that of a high-school course. The training is not in any sense that of a trade school, but is that of a regular engineering school of high standards.

The School offers five branches of engineering: civil, mechanical, electrical, chemical, and administrative. The end sought is to give to students who have already had a high-school preparation, or its equivalent, a good training in the fundamental sciences of mathematics, chemistry, and physics, and in the important applications of the principles of these sciences to the several branches of engineering. Much stress is laid on the development of the ability to apply the acquired knowledge to new engineering problems, and an effort is made to be thorough without leading the student through a maze of mere mental gymnastics.

The program of studies differs from that of many schools, in that a student is not permitted a wide range of subjects from which to choose. It has been found that better results are obtained by prescribing the principal studies which the student is to pursue.

Plan of Operation of the School

To illustrate the plan of operation of the School, let us take the case of two men, "A" and "B" who desire to take any one of the various courses offered.

If the men are members of any one of the three upper classes (sophomore, junior, or senior), "B" will be assigned to one of the plants of a firm that is co-operating with the School. Here he receives his practical experience by actual work under School supervision for a period of five weeks. "A" who is called the alternate of "B" has meanwhile been attending classes at the School. At the end of the five-week period, "B" and "A" change places, that is, "B" takes the place of "A" at School, while "A" relieves his alternate at the plant of the employing firm. This process is repeated each period, these same two students alternating on the same job for at least one calendar year.

In the case of freshmen students, the alternating period is of twenty weeks' duration and the practical work is not necessarily of an engineering character. Division B freshmen will ordinarily continue with such employment as they may obtain for themselves up to the time of admission to the class rooms. Division A freshmen will be allowed to assume during their working period any kind of employment that will give promise of best remuneration. With either division, however, the students will be expected, when so advised by the Engineering Practice Department, to take Engineering Practice jobs where the nature of the work does not require any particular previous training.

Relation of School to High Schools

This School is peculiarly adapted to the high school graduate with limited financial resources who still has the ambition and ability to get ahead if given the opportunity.

This year the school has a student body made up of graduates of the following schools:

Abington High School
Alton (N. H.) High School
Amherst High School
Amesbury High School
Annapolis Royal Academy
(Granville Ferry, Nova Scotia)
Anson (Me.) Academy
Arlington High School
Ashland High School
Athol High School
Attleboro High School
Avon High School
Ayer High School
Baddeck High School
(Sidney, Nova Scotia)
Bangor (Me.) High School
Bar Harbor (Me.) High School
Bartlett High School (Webster)
Beezazian School (Constantinople, Turkey)
Belfast (Me.) High School
Bellows Falls High School
Belmont High School
Berkeley Preparatory School
Berlin (N. H.) High School
Berwick (Me.) Academy
Beverly High School
Boothbay Harbor (Me.) High School
Boston College High School
Boston Latin High School
Bourne High School
Braintree High School
Brewster Free Academy
(Wolfeboro, N. H.)
Bridgeport (Conn.) High School
Bridgewater High School
Brighton High School
Bristol (Conn.) High School
Bristol (Me.) High School
Brockton High School
Brookfield High School
Brookline High School
Brunswick (Me.) High School
Burlington (Vt.) High School
Calais (Me.) Academy
Cambridge Latin High School
Canaan (Vt.) High School
Canton High School
Central High School
(San Juan, Porto Rico)
Chelmsford High School
Chelsea High School
Chester High School
Chicopee High School
Clinton High School
Cohasset High School
High School of Commerce
Colby (N. H.) Academy
Concord (Mass.) High School
Concord (N. H.) High School
Conway High School
Cony High School
(Augusta, Me.)
Cranston (R. I.) High School
Dalton High School
Danvers High School
Dean Academy
Dedham High School
Deep River (Conn.) High School
Deering (Me.) High School
Dexter (Me.) High School
Dorchester High School
Drury High School
Dummer Academy
Duxbury High School
East Boston High School
East Bridgewater High School
East Towers (Mich.) High School
Eastport (Me.) High School
Enfield High School
(Thompsonville, Conn.)
English High School
Essex County Agricultural School
Essex (Mass.) High School
Essex (Vt.) High School
Everett High School
Exeter (N. H.) High School
Fair Haven (Vt.) High School
Fairhaven (Mass.) High School
Fall River High School
Fitchburg High School
Foxboro High School
Framingham High School
Franklin (Mass.) High School
Franklin (N. H.) High School
Freeport (Me.) High School
Fryeburg (Me.) Academy
Gardner High School
Georgetown High School
Gilman (Me.) High School
Gloucester High School
Gould's Academy (Bethel, Me.)
Greenfield High School
Groton High School
Groveland High School
Hallowell (Me.) High School
Hanover High School
Hardwick (Vt.) Academy
Hartford (Conn.) High School

Haverhill High School
Hingham High School
Holbrook High School
Holden High School
Holliston High School
Holyoke High School
Hopedale High School
Horblitt Preparatory School
Hudson High School
Huntington School
Hyde Park High School
Island Pond (Vt.) High School
Jonesport (Me.) High School
Keene (N. H.) High School
Kennebunk (Me.) High School
Kimball High School
Kimball Union (N. H.) Academy
Kingston High School
South Kingston (R. I.) High School
Laconia (N. H.) High School
Lancaster High School
LaSalle (R. I.) Academy
Lausitz High School (Germany)
Lawrence High School
Lee High School
Leicester High School
Lewis (Conn.) High School
Lewis & Clark High School (Washington)
Lewiston (Me.) High School
Lexington High School
Littleboro High School
Livermore Falls (Me.) High School
Los Angeles (Cal.) High School
Lowell High School
Lubec (Me.) High School
Lyman Hall (Conn.) High School
Lynn Classical High School
Lynn English High School
Madison (Me.) High School
Maine Central Institute (Me.)
Malden High School
Manchester (Mass.) High School
Manchester (N. H.) High School
Mansfield High School
Marblehead High School
Marlboro High School
Marshfield High School
Maynard High School
McKinley (D. C.) High School
Mechanic Arts High School
Medfield High School
Medford High School
Medway High School
Melrose High School
Meriden (Conn.) High School
Mexico (Me.) High School
Middlebury (Vt.) High School
Middletown (Conn.) High School
Milbridge (Me.) High School
Milford High School
Milton High School
Monson Academy
Montpelier (Vt.) Seminary
Montpelier (Vt.) High School
Murdock High School
Mt. Hermon School
Nantucket High School
Nashua (N. H.) High School
Natick High School
Needham High School
New Britain (Conn.) High School
New Gloucester (Me.) High School
New London (Conn.) High School
Newburyport High School
Newton High School
Newton Vocational School
North Attleboro High School
North Berwick (Me.) High School
Northeastern Secondary School
Norton High School
Norwell High School
Norwood High School
Nute (N. H.) High School
Orange High School
Pawtucket High School
Peabody High School
Petersham High School
Petrograd Technical School (Petrograd, Russia)
Phillips Exeter Academy (N. H.)
Pittsfield High School
Plainfield (Conn.) High School
Plainfield (Mass.) High School
Plymouth High School
Portland (Me.) High School
Portsmouth (N. H.) High School
Pratt (Conn.) High School
Proctor (Vt.) High School
Providence Technical High School
Provincetown High School
Putnam (Conn.) High School
Quincy High School
Reading High School
Revere High School
Richards (N. H.) High School
Richford (Vt.) High School
Rindge Technical High School
Rochester (N. H.) High School
Rochester (N. Y.) High School

Rockland High School
Rumford (Me.) High School
Sacred Heart High School (R. I.)
Salem High School
Sanderson Academy
Sanford (Me.) High School
Saugus High School
Schuylerville (N. Y.) High School
Scituate High School
Sharon High School
Shrewsbury High School
Simsbury (Conn.) High School
Skowhegan (Me.) High School
Solon (Me.) High School
Somerset High School
Somersworth (N. H.) High School
Somerville High School
South Boston High School
Springfield Technical High School
Springfield Central High School
Stephens (Me.) High School
Stevens (N. H.) High School
Stoneham High School
Stonington (Conn.) High School
Stoughton High School
Stowe High School
Strong (Me.) High School
Sudbury High School
Sutton High School
Swampscott High School
Taunton High School
Templeton High School
Thayer Academy
Thompson High School (Conn.)
Tilton (N. H.) Seminary
Torrington (Conn.) High School
Townshend (Vt.) High School
Traip (Me.) Academy
Upton High School
Vinalhaven (Me.) High School
Wakefield High School
Walpole High School
Waltham High School
Wareham High School
Waterbury (Vt.) High School
Watertown High School
Wellesley High School
West Hartford (Conn.) High School
West Roxbury High School
West Springfield High School
Westbrook (Me.) Seminary
Westfield High School
Westinghouse High School
Weymouth High School
Whitman High School
Williamstown High School
Williston Seminary
Wilmington High School
Wilton (N. H.) High School
Windham (Conn.) High School
Windsor (Vt.) High School
Winthrop High School
Woburn High School
Woodstock (Conn.) Academy
Woodstock (Vt.) High School
Woodsville (N. H.) High School
Worcester Classical High School
Worcester Commercial High School
Worcester South High School
Worcester Trade School
York (Me.) High School

ENGINEERING EQUIPMENT

Field Instruments of Civil Engineering

For work in the field, the Civil Engineering Department possesses various surveying instruments, representing the principal makes and types in general use. The equipment includes two Kêuffel & Esser transits, two Buff & Buff transits, two Berger levels, two other levels, and three plane table outfits. There are Locke hand levels, flag poles, leveling rods, stadia rods, engineers' and surveyors' chains, steel and cloth tapes, and all the miscellaneous equipment necessary to outfit the parties that the instruments will accommodate. The transits are equipped with neutral glasses and reflectors for astronomical observations. For higher surveying there is an aneroid barometer for barometric leveling, a sextant for hydrographic surveying, and a Gurley electric current meter for hydraulic measurements.

The extent of the equipment and scope of the field work itself are designed to train the student's judgment as to the relative merits of the various types of field instruments.

Mechanical Laboratories

The steam power plant is completely equipped with meters, scales, indicators, Orsat apparatus, one CO_2 recorder, and all other equipment necessary for making complete power plant tests. The plant consists of four horizontal-return tubular boilers, two of which are equipped for burning fuel oil and two for burning coal; and four three wire generators, of which three are driven by Ridgway reciprocating steam engines of various sizes, and the other is direct connected to a Westinghouse-Parsons turbine. This places at the disposal of our classes a well-equipped, up-to-date engineering laboratory, and gives them the means of carrying on boiler tests, determining the efficiencies of various fuels and oils, taking indicator diagrams, determining the efficiency of modern reciprocating engines and turbines when direct connected to generators, as well as renders them familiar with all the various auxiliary appliances of such a plant, as separators, pumps, air compressors. Apparatus is also available for slide valve setting, gauge testing, measuring flow of air, steam, and water, and Prony brake testing.

Electrical Measurements Laboratory

The laboratory was entirely rebuilt during the summer of 1920. It is equipped with apparatus fundamentally planned for teaching the principles of measurement, rather than for the precise determination of quantitative results. Nevertheless it is necessary for the proper performance of work in the other laboratory courses that a certain amount of careful quantitative work should be done, and the equipment is being steadily increased and developed with both ends held in view.

A partial list of the apparatus available for instruction is the following. Under the first head, resistance by Ohm's law, substitution and direct reflection, voltmeter methods for high resistance, insulation resistance, specific resistance, slide wire bridge, electrostatic capacity, inductance, Poggendorf's method of E. M. F. comparison. Under the second head, a Laboratory standard Wheatstone bridge, a Kelvin low resistance bridge, a Leeds Northrup potentiometer with two standard Weston cells, volt box and steady source of high voltage for voltmeter calibration, a commutator, and leads for use with the Carey-Foster method, and a chemical balance.

The instrument room is supplied with 18 high-grade G. E. and Weston ammeters and voltmeters of various sizes for D. C. work, together with numerous similar instruments of cheaper quality for lower class work.

For A. C. testing, there are 27 voltmeters and ammeters of various sizes arranged in groups of three for polyphase work, and 8 single or three phase wattmeters.

There is also a considerable amount of auxiliary apparatus such as frequency indicators, synchroscopes, and power factor meters.

Electrical Engineering Laboratory

The Laboratory was entirely remodeled during the summer of 1920. It is equipped with numerous machines of different types, the size and voltage ratings being selected to reduce as much as possible the risk from large voltage and power apparatus, while at the same time making available to the student commercial apparatus such that the various quantities it is desired to measure will be of reasonable dimensions.

Moderate-sized machines are used principally for this reason, but also because the students in their Engineering Practice come into contact with the large-sized and varied machinery of modern power houses and electrical plants generally.

Among the machines of this department are a pair of matched Holtzer-Cabot 5 kv-a synchronous converters, specially planned to operate as 3 phase generators, motors, or double current generators. They are driven independently by 10 HP 220-volt General Electric interpole motors, and may also be mechanically coupled for certain work.

There is also a pair of matched and specially designed direct current generators of 6 kilowatt rating at 220 volts, which may be operated either shunt or compound, driven by a 15 kilowatt interpole Sprague motor with double extended shaft. These machines are particularly intended for work on characteristics and parallel operation, but may also be coupled so as to be available in the various "pumping back" methods of testing.

Alternating current is supplied by a three phase General Electric 15 kv-a alternator, giving practically a pure sine wave, driven by a 20 kw Westinghouse motor; there is also a 7.5 kv-a General Electric alternator driven from a 15 HP Sprague motor, fitted with taps from each armature coil, a 5 kv-a Holtzer-Cabot machine with two spare rotors, making it available either as a generator, synchronous motor, squirrel cage or phase wound induction motor; and a dozen or so more motors and generators of various sizes and types.

There are two sets of G. E. type H transformers, three to the set, of 3 kv-a rating with primary voltage of 550 and secondary of 220-110, which may be used for transmission experiments as well as ordinary testing, and a very considerable assortment of variable ratio transformers, reactances, condensers, and similar control and testing apparatus aside from the very complete line of instruments belonging to the Electrical Measurements Laboratory.

Chemical Laboratories

The School has three laboratories completely equipped in all respects for carrying on all lines of chemical work, from

that of a high school to that of most advanced college grade. They have accommodations for over one hundred and fifty students, and are suitably furnished with all the necessary appliances for chemical work. Some of these are: hoods, drying closets, a still, steam and hot water baths, electrolytic circuits, vacuum and pressure apparatus, balances, combustion furnaces, and complete sets of apparatus for the sampling and analysis of flue gases and fuels. There are also testing machines for oils, viscosimeters, and different sorts of flash point apparatus. A chemical museum is connected with this department where are kept specimens for purposes of illustration.

Design and Drafting Rooms

The School possesses large, light, and well-equipped drawing rooms for the carrying on of the designing and drafting which form so important a part of engineering work. These rooms are supplied with lockers containing the drawing supplies, and files containing blue prints, and photographs of machines and structures that represent the best practice.

Physics Laboratories

The Physics Department has two large laboratories completely equipped with all necessary apparatus for the experimental work that is required of the students, as well as that required for lecture demonstration. The apparatus and equipment includes verniers, levels, vacuum pump, planimeters, spherometers, calorimeters, thermometers, pyrometer, sonometer, spectroscope, spectrometer, balances, standard gram weight, lecture table galvanometer, optical disk with all accessories, lenses, photometer, air thermometer, and a full set of weather bureau apparatus, including barograph, thermograph, hygrometer, barometer, maximum and minimum thermometers, etc. These give a wide range to the experimental work that can be done.

Libraries

Students of the School have available for their use the general library of the Association, which includes, for their exclusive use, a large collection of engineering texts, refer-

ence books, and current periodicals on engineering and scientific subjects.

In addition, all members of the School have the privilege of taking books from the Boston Public Library, which offers a very unusual opportunity to our non-resident students. The School is within easy access to the Public Library, which enables students to have unlimited reference to engineering subjects at any time.

Department of Physical Training

Northeastern has exceptional facilities for all-round physical training. The gymnasium with its 12-lap running track, three basketball courts, wrestling, boxing, fencing and special exercise rooms, handball courts and bowling alleys, is one of the most complete in New England. The natatorium is one of the best in the country. It is in a separate building, having a glass roof, admitting abundant sunlight, and has a continuous supply of filtered salt water. The tank is 75 feet long and 25 feet wide. Adjoining the building is a large field equipped for athletics. Here are four tennis courts, outdoor gymnasium, basketball court, jumping pits and a track with a 100-yard straightaway; baseball and football fields. Interclass contests are arranged in basketball, baseball, tennis, indoor and outdoor athletics, and swimming. Intercollegiate games and meets are arranged with the leading colleges in the East.

ENGINEERING PRACTICE

Correlation of Practical and Theoretical Work

The employers who co-operate with us agree, where practicable, to employ the students in all the different departments of their establishments during their periods of engineering practice. This training is just as complete as the school work, and is just as thorough. Where possible, the course of the student is from the handling of the raw material to the shipment of the finished product. This practical training includes the use of the machines, as well as the executive duties of the plant, so that at the end of his course the graduate may not only know how to do things, but also why they are done in certain ways. Detailed reports are made by each student

for each of his working periods. The subjects for these reports are chosen by the student and may be anything of importance in connection with his job. These reports are criticized and discussed when the student returns to school. Accurate records and grades are kept of the engineering practice of each student, and it is not possible to secure a degree unless this part of the course is completed successfully.

Number of Positions Available

The number of positions at our disposal in any one branch of engineering is necessarily limited. Thus far we have secured desirable positions for our students as the growth of the School has demanded. Nevertheless, to be at all sure of work in his chosen branch of engineering, an applicant should file his application early.

Sometimes students may secure their own positions with firms, in which case an alternate can usually be furnished by the School, if desired. Such individual arrangements are entirely acceptable to the School, and may be made by any applicant, subject to the approval of the Director of Engineering Practice.

Attitude of Co-operating Firms

The favorable attitude of the co-operating concerns toward our plan is shown by their retention of the same students from year to year, even after graduation, and also in the fact that whenever vacancies occur which can be filled by our men, the firms often apply for additional students to fill them. The men under whose supervision the students have been in their outside work are practically unanimous in approval of our plan, and speak highly of the enthusiasm, earnestness, and intelligence the students have shown in the performance of their duties.

Working Relations

When a student is first assigned to a firm, the School gives him general information in regard to the work and a letter of introduction. At the first interview the student is expected to familiarize himself with the kind of work on which he is to be engaged while with the firm, and the conditions under which he is to work. It is expected that no student will

accept employment through the school unless he can and will continue in School and with the firm in question throughout the year in accordance with the general plans of Engineering Practice. During the periods of Engineering Practice the students report for work at the regular working hours of the firm, no special privileges being granted. Students are not permitted to discontinue Engineering Practice except under unusual conditions and only by previous arrangements with the School. *In all cases of absences from Engineering Practice, whether unavoidable or not, the student or a member of his family is required to notify the employing firm by telephone immediately at or before the time of the occurrence of the absence.* This matter of notifying the employing firm immediately is very important. Failure to do so is sufficient cause for dismissal.

The School places the student at work with the employing firm and is responsible for his presence and conduct at work as well as the quality and scope of his work. All difficulties arising in regard to students who are in Engineering Practice are taken up with the School at the next following school period. *It is absolutely necessary that each student be prepared to fulfill his engineering practice obligations as faithfully during the summer months as at any other time,* and no student can ordinarily expect any longer vacation than the regular three weeks specified during the summer.

Students in the sophomore, junior, and senior years are almost invariably placed with firms which give them experience directly in line with the course of study followed at school.

Freshmen, as a rule, are assigned to work not so technical in character, but designed to train the younger men in the fundamental qualities of cheerfulness, dependability, enthusiasm, and grit. These attributes are essential to the successful completion of the upper class work. They are emphasized at every opportunity during the student's college life in connection with his engineering practice, and the first year's training is designed especially to develop these habits. If a young man can form habits of mental and physical alertness and reliability, he has laid a sure foundation for his success and happiness in after life. The detailed technical information and experience is added in the three upper years.

In general, all changes and transfers in Engineering Practice are made at the beginning of the school year in September.

Earnings

The firms treat our students as they do their other employees in manner of payment, rates of pay, chances for promotions, etc. Each firm makes individual arrangements with the student, and the School does not attempt to supervise except for occasional consultations with the employers over general policies.

The rates of pay for students in the School are kept low so that the employer feels justified in devoting time to the instruction of the students and in transferring students from one department to another at approximately regular intervals.

By agreement with the co-operating firms the following minimum wages are paid to students:

$10 per week for the first school year.
12 per week for the second school year.
14 per week for the third school year.
16 per week for the fourth school year.

Ordinarily a student starts with each firm at the minimum wage and is promoted as his ability may warrant. In certain cases the students receive less than the minimum stated above, but this is usually made up to them in some other way.

No upper limit of wages is set. The average maximum is $18 to $20 even for men of exceptional ability, because the students are given the privilege of attending school on the co-operative plan and of being transferred from one department to another. The sum earned is more than enough to pay the tuition and the necessary expenses of schooling, but does not cover the cost of living.

Schedules of Practical Work

Below are typical schedules of practical work that have been prepared for our students by some of the companies which are giving them employment:

Boston & Maine Railroad Co.

One Year	Erecting Dept.
One Year	Machine Dept.
One Year	Machine Dept.
One Year	Erecting Dept.
	Drafting Room

Simplex Wire & Cable Co.

One Year	Insulating Dept.
	Braiding Dept.
One Year	Cable Shop
	Twisting Dept.
One Year	Machine Shop Construction Gang
	Electrical Construction Gang
One Year	Testing Room

The Dennison Manufacturing Co.

One Year	Carpenter's Helper
	Pattern Maker's Helper and Case Making
	Mill-wright Work and Elevator, Fire Door Inspection
	Helper in Electrical Dept.
One Year	Machine Shop Stock Room
	Machine Shop
	Machine Shop
	Grinding Room
One Year	Power Plant Work
	Accident Prevention Work
	Filing Plans, Blue Prints, Tracing, Etc.
	Planning Dept. Work
One Year	Tracing and General Work
	Detailing and General Drafting

Crofoot Gear Works

One Year	Inspection Dept.
	Finishing Dept.
One Year	Hobbing Dept.
	Cutting Dept.
One Year	General Grinding Dept.
	Tool Making

Simplex Electric Heating Co.

One Year	Machine Dept.
One Year	Grinding Dept.
	Stock Dept.
	Winding Dept.
	Enameling Dept.
	Assembling Dept.
One Year	Testing Dept. First Division
	Testing Dept. Second Division
One Year	Shipping Dept.
	Drafting Dept.
	General Shop Experience

Boston & Albany Railroad Co.

One Year	Work in Field Party
One Year	Work in Drafting Room
One Year	Masonry Inspection
	General Railroad Work
	Railroad Accounting
One Year	Railroad Accounting
	Timekeeping and Unit Costs

Condit Electrical Manufacturing Co.

One Year	Testing D. C. Apparatus Testing A. C. Apparatus
One Year	Switchboard Construction Installation
One Year	Blue Printing Drafting
One Year	Engineering Engineering Specifications

Co-operating Firms

Aberthaw Construction Company, Boston (Civil)
Acme Apparatus Company, Cambridge (Electrical)
American Acid Company, Medford (Chemical)
American Agricultural Chemical Company, Everett (Chemical)
American Glue Company, Peabody (Electrical)
American Radio & Research Corporation, Medford Hillside (Electrical)
American Steam Gauge & Valve Company, Boston (Mechanical)
Appleton, Thomas A., Civil Engineer, Salem (Civil)
Arlington Foundry, Arlington (Chemical and Mechanical)
Arnold Machine Shop, Rockland (Mechanical)
Aspinwall & Lincoln, Civil Engineers, Boston (Civil)
Barnes, Rowland H., Civil Engineer, Waltham (Civil)
Bates, Walter C., Surveyor, Jamaica Plain (Civil)
Beacon Oil Company, Everett (Chemical)
Bethlehem Shipbuilding Corporation, Quincy (Civil, Mechanical, Electrical)
Blanchard Machine Company, Cambridge (Mechanical)
Boston & Albany Railroad, Boston (Civil)
Boston Consolidated Gas Company, Boston (Chemical)
Boston Fuel Testing Company, Boston (Chemical)
Boston India Rubber Company, Boston (Chemical)
Boston & Maine Railroad, Boston (Mechanical and Civil)
Boston University–Laboratory, Boston (Chemical)
Boston Varnish Company, East Everett (Chemical)
Boston Woven Hose & Rubber Company, Cambridge (Mechanical, Chemical, Administrative)
Brackett, L. G., Civil Engineer, Boston (Civil)
Broadway Iron Foundry, Cambridge (Mechanical)
Buff & Buff Manufacturing Company, Jamaica Plain (Civil, Mechanical)
Butt, H. G., Manufacturing Company, Boston (Mechanical)
Cadillac Automobile Company, Boston (Mechanical)
Cambridge Rubber Company, Cambridge (Electrical)
Chase–Shawmut Company, Newburyport (Electrical)
Coffin Valve Company, Neponset (Mechanical)
Conant Machine Company, Concord (Mechanical)
Condit Electrical Manufacturing Company, South Boston (Electrical)
Crittenden Manufacturing Company, Jamaica Plain (Mechanical)
Crocker, H. S., City Engineer, Brockton (Civil)
Crocker Pen Company, Everett (Mechanical)

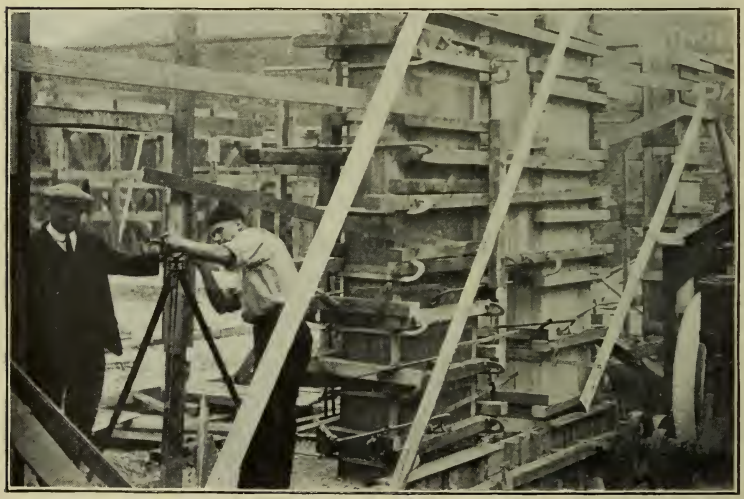
Students in Class Work

Class in Physics Laboratory
NORTHEASTERN COLLEGE

Class in Organic Chemistry
NORTHEASTERN COLLEGE

Civil Engineering Students

Making a Plane Table Survey
CLASS IN SURVEYING FIELDWORK



Levelling for Building Construction
SIMPSON BROS. CORPORATION

Crofoot Gear Works, Hyde Park (Mechanical)
Crosby Steam Gage & Valve Company, Charlestown (Mechanical)
Dennison Manufacturing Company, Framingham (Mechanical and Electrical)
Driscoll & Company, Heating Contractors, Salem (Mechanical)
Eastern Metal & Refining Company, Malden (Mechanical)
Eastman and Bradford, Civil Engineers, Lynn (Civil)
Edison Electric Illuminating Company, Boston (Mechanical, Electrical, Chemical)
Electric Maintenance Company, Boston (Electrical)
Elliot, C. J., Civil Engineer, Boston (Civil)
Ellis Manufacturing Company, Milldale, Conn. (Mechanical)
Emerson Apparatus Company, Melrose (Mechanical)
Evans, R., Essex County Engineer, Salem (Civil)
Farnham, Ralph J., Civil Engineer, Wellesley (Civil)
Fuller, George A., Company, Boston (Civil)
Gannett, Charles H., Civil Engineer, Boston (Civil)
General Electric Company, Lynn (Mechanical, Electrical and Chemical)
Glenlyon Dye Works, Saylesville, R. I. (Chemical)
Holtzer Cabot Electric Company, Roxbury (Electrical)
Hood Rubber Company, Watertown (Mechanical)
Howe & French, Boston (Chemical)
Hume Body Corporation, Boston (Mechanical)
Humphrey, C. B., Court Surveyor, Boston (Civil)
Hunt–Spiller Manufacturing Company, South Boston (Chemical)
Hygrade Lamp Company, Salem (Electrical)
Industrial Engineering Corporation, Boston (Chemical)
Jager, Charles J., Company, Boston (Mechaniçal)
Jenney Electrical Manufacturing Company, Brockton (Electrical)
Joy, C. F., Jr., Town Engineer, Milton (Civil)
Kinney Manufacturing Company, Jamaica Plain (Mechanical)
Knott, L. E., Apparatus Company, Cambridge (Mechanical and Chemical)
Landers, Frary & Clarke, New Britain, Conn. (Mechanical)
Lawton Mills Corporation, Plainfield, Conn. (Mechanical)
Lever Brothers, Soap Manufacturers, Cambridge (Chemical)
Lewis, Green, McAdams and Knowland, Cambridge (Chemical)
Lynn, City of, Water Dept. (Civil)
Maine State Highways, Augusta, Maine (Civil)
Malden & Melrose Gas & Electric Company, Malden (Electrical and Chemical)
Manhassett Manufacturing Company, Putnam, Conn. (Electrical)
Massachusetts Institute of Technology, Cambridge (Chemical)
Massachusetts Public Works Dept., Division of Highways, Boston (Civil)
Massachusetts Public Works Dept., Testing Laboratory, Boston (Chemical)
McClintock & Woodfall, Civil Engineers, Boston (Civil)
McElwain, W. H., Company, Manchester, N. H. (Mechanical)
McIntire, F. N., Brass Works, Boston (Mechanical)
Merchant, A. P., Company, Boston (Electrical)
Merrimac Chemical Company, North Woburn (Chemical)
Metal Goods Manufacturing Company, Inc., Boston (Mechanical and Electrical)

Monks and Johnson, Structural Engineers, Boston (Civil)
Morgan Construction Company, Worcester (Mechanical)
Moss Electrical Company, Putnam, Conn. (Electrical)
New England Coal & Coke Company, Everett (Chemical)
New England Oil Refining Company, Fall River, Mass. (Civil)
New England Structural Company, Everett (Mechanical)
Newton City Engineer (Civil)
Norfolk Iron Works, Quincy (Civil)
Northeastern College Laboratories (Civil, Mechanical, Electrical and Chemical)
Norwood Town Engineer (Civil)
Old Colony Foundry, East Bridgewater (Mechanical)
Old Colony Tool Company, Taunton (Mechanical)
Paver's Machine Shop, Franklin (Mechanical)
Plymouth Cordage Company, Plymouth (Mechanical)
Plymouth Electric Light Company, Plymouth (Electrical)
Plymouth Town Engineer (Civil)
Pneumatic Scale Corporation, Norfolk Downs (Mechanical)
Potter, Herbert S., Electrical Contractor, Boston (Electrical)
Portland, Maine, Department of Public Works (Civil)
Punchard, W. H., Landscape Architect, Boston (Civil)
Putnam Machine Company, Fitchburg (Mechanical)
Sanborn Company, Instrument Manufacturers, Boston (Mechanical and Electrical)
Sherry, Frank E., Civil Engineer, Boston (Civil)
Simplex Electric Heating Company, Cambridge (Electrical)
Simplex Wire and Cable Company, Cambridge (Electrical)
Simpson Brothers Corporation, Boston (Civil)
Skinner Organ Company, Dorchester (Civil)
Skinner, Sherman & Esselen, Inc., Boston (Chemical)
Starret, L. S., Tool Company, Athol (Mechanical)
Stevens Duryea Company, Chicopee Falls (Mechanical and Electrical)
Sturtevant, B. F., Company, Hyde Park (Mechanical and Electrical)
Trimont Manufacturing Company, Roxbury (Mechanical)
Trufant, A. P., Civil Engineer, Brockton (Civil)
Turner Construction Company, Boston (Civil)
Union Spinning & Plating Company, Boston (Mechanical)
United Electric Railways Company, Providence, R. I. (Mechanical and Electrical)
United Shoe Machinery Company, Beverly (Mechanical and Electrical)
United States Envelope Company, Holyoke (Mechanical)
Vennard, William L., City Engineer, Lynn (Civil)
Victor Shoe Machinery Company, Lynn (Mechanical)
Waltham Motor Manufacturers, Inc., Waltham (Mechanical)
Waltham Watch Company, Waltham (Mechanical and Chemical)
Warren Brothers Company, Paving Materials Laboratory, Cambridge (Chemical)
Werby Laboratories, Boston (Chemical)
Westinghouse Electric Manufacturing Company, Springfield (Electrical)
Whitman and Howard, Civil Engineers, Boston (Civil)
Willard Service Station, South Framingham (Electrical)
Wollaston Foundry Company, Norfolk Downs (Mechanical)
Worcester Electric Light Company, Worcester (Mechanical and Electrical)

REQUIREMENTS FOR ADMISSION

General Statement

In general, the preparation necessary to enable an applicant to pursue successfully one of the regular curriculums in the School corresponds to the four-year course of study offered by high schools of the better grade. The requirements of age and scholarship are regarded as the minimum in all ordinary cases, and only exceptional circumstances will justify any relaxation. Parents and guardians are advised that it is generally for the ultimate advantage of the student not to enter under the age of sixteen years. Every applicant must furnish references as to his character and ability, and must show cause why he may reasonably be expected to make a success of his course, both in the School and in Engineering Practice. He must be willing and able to work hard, both mentally and physically.

Admission to the First Year

Students are admitted to the first year in all curriculums at the opening of the first semester in September and at opening of the second semester in January. An applicant for admission as a regular student to the School is required to present evidence of graduation from an accredited four-year high school, or the equivalent, and to have included in his course of study algebra as far as quadratics and plane geometry. The completion of fifteen units of preparatory subjects satisfactory to the Committee on Admission is considered equivalent qualification. Students whose high school courses have not included the required algebra and plane geometry must take special entrance examinations, the dates of which are scheduled elsewhere in this catalog. Certificates of entrance examinations passed for admission to colleges, or technical schools of good standing, may be accepted in lieu of entrance examinations.

In exceptional cases a student who is not a high school graduate may be allowed to enter as a special student, but only after his case has been passed on favorably by the Committee on Admission. Every applicant is urged to remain in high school until he is graduated, even though he might be able to qualify for entrance before receiving his high school diploma.

A student obtaining a low rating on his entrance examinations, or who may not be eligible to assignment to Engineering Practice for other reasons, may by special permission be allowed to attend school either every period or every alternate period. When a student's record justifies such a procedure, he may be assigned to Engineering Practice.

Application for Admission

Each applicant for admission to the School is required to fill out an application blank, whereon he states his previous education, as well as the names of persons to whom reference may be made in regard to his character and previous training.

An application fee of five dollars ($5) is required when the application is filed. This fee is non-returnable if the applicant is accepted. If he is rejected, one-half the fee will be returned upon request.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five dollar fee to Carl S. Ell, Dean, 316 Huntington Avenue, Boston, Mass.

Upon receipt of the application, properly filled out, the School at once looks up the applicant's references and high school records. When replies have been received to the various inquiries instituted, the applicant is at once advised as to his eligibility for admission to the School. All applicants must meet the Dean for a personal interview before being finally accepted by the School. This interview may be postponed if desired until the opening of School in the fall.

First Tuition Payment

Should a student wish to be assigned to a position with a co-operating firm before the regular opening of School, he is required to fill out a registration card and also an application for membership in the Boston Y. M. C. A. The first payment of tuition must be paid before he will be assigned to any position at Engineering Practice.

Before any student shall be allowed to attend classes, he shall have made the first tuition payment. This is in addition to the application fee of five dollars ($5) and the Student Activities fee of fifteen dollars ($15), and may be paid at any time before school opens.

Birth and Educational Certificates

The law in regard to the hours and conditions of labor by minors makes it necessary that all students under twenty-one years of age shall obtain Educational Certificates before they can be accepted by co-operating firms. For those students who live outside of Boston, it will save time and trouble if they bring a Certificate of Birth, or an Educational Certificate, with them on coming to Boston. The Educational Certificates are obtained free, upon request, from the Superintendent of Schools in the city or town where the student lives, if he lives in Massachusetts. For students living in other states a Certificate of Birth, or its equivalent, is all that will be necessary.

Subjects for Examination

Applicants who have not passed algebra to quadratics and plane geometry satisfactorily in their courses of study in high school are required to pass entrance examinations in these subjects.

By writing the School, prospective applicants may receive copies of former entrance examinations. These copies are available for distribution and may be obtained at any time.

The detailed requirements in these subjects are as follows:

Algebra

The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; linear equations, both numerical and literal, containing one, or more, unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative.

Plane Geometry

The usual theorems and construction of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas, regular polygons and the measurement of the circle.

The solution of numerous original exercises, including loci problems. Applications to the mensuration of lines and plane surfaces.

Entrance Examinations in Boston

Examinations for admission to the first year class will be held at 316 Huntington Avenue in January, June and September of each year.

Students are advised to attend the January or June examinations, if possible, in order that any deficiencies then existing may be made up in September.

The time of examinations is as follows:

10:00 a. m. to 12:00 m., Algebra;
1:00 p. m. to 3:00 p. m., Plane Geometry.

During the current year the examinations will be given on the following days: January 19, 1922; June 15, 1922; Sept. 7, 1922.

No fees are to be paid at the time of the examination.

Preparatory Schools

There are day and evening preparatory schools conducted by Northeastern. Students having entrance conditions, or requiring further preparation for the entrance examinations, may avail themselves of this opportunity to cover the desired work.

Provisional Acceptance

When, for any reason it is deemed advisable, the School reserves the right to place any entering student upon a period of probation, extending from one to three months, before placing him at practical work. Whether he shall be placed at work at the end of this time or not will be determined by the character of the work that he has accomplished during this probationary period.

SCHOOL INFORMATION IN DETAIL

Location

The School is housed in the buildings of the Association, and in addition occupies the entire third floor of the Gainsborough Building, directly opposite.

The buildings are located on Huntington Avenue, just beyond Massachusetts Avenue, and are within easy access to the various railroad stations, and the business and residential sections. A map is shown on the following page.

Residence

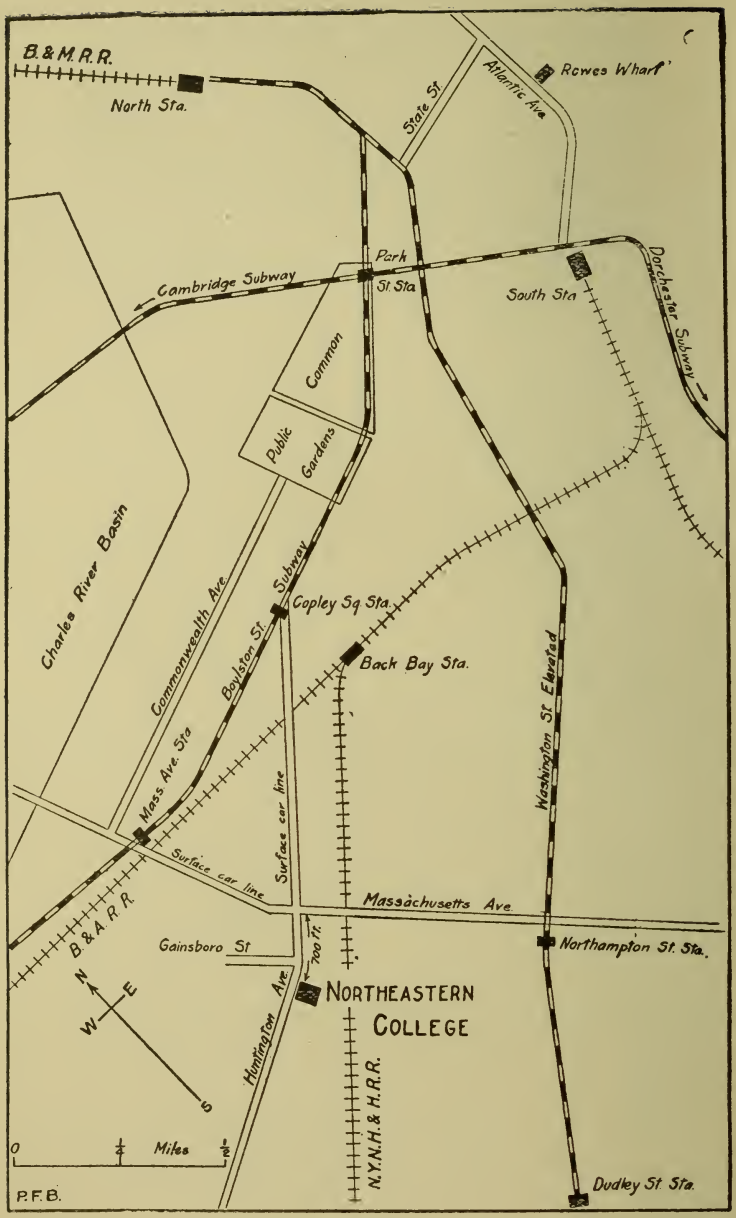
It has been found to be much more satisfactory for the student to live within easy access of Boston, especially during periods in school, than to live out twenty-five or thirty miles. The saving of time and effort more than offset any increased expense.

There are limited accommodations at very moderate rates in the dormitories. These rooms may be had separately or in groups with a common reception room. The price varies from $2.25 per week upwards. Since board costs about $8.00 per week, a student may obtain room and board for from $10.25 per week upwards.

Residence in Boston, though not required, is advisable as it gives the student opportunity to use the college facilities outside of class hours, and to confer easily with his instructors about his college work. It also gives him a wider range in the choice of a co-operating position, since he can readily report for early work if necessary, which is often impossible if the student lives at a distance from Boston. Moreover, residence in Boston gives the student close connection with the activities of college life.

The School officials have no jurisdiction in the matter of dormitory assignments. Students should write the House Secretary of the Boston Y. M. C. A. for rooms in the dormitories.

The Department of Student Activities maintains a registry of suitable rooms in the nearby houses for the convenience of students desiring accommodations outside of the dormitories.


B. & M. R. R.
North Sta.
State St.
Atlantic Ave.
Rowes Wharf
Park St. Sta.
Cambridge Subway
South Sta.
Dorchester Subway
Common
Public Gardens
Charles River Basin
Commonwealth Ave.
Boylston St. Subway
Copley Sq. Sta.
Back Bay Sta.
Mass Ave. Sta.
Surface car line
Surface car line
Washington St. Elevated
Massachusetts Ave.
B. & A. R. R.
Gainsboro St.
700 ft.
Northampton St. Sta.
NORTHEASTERN COLLEGE
Huntington Ave.
N.Y.N.H. & H.R.R.
Dudley St. Sta.
N
W
E
S
0
Miles
P.F.B.

School Year

The school year for all students is of forty-nine weeks' duration, divided into twenty-three weeks of school work and twenty-six weeks of engineering practice. Thus each student has three weeks of vacation each year. The school work is divided into three terms—the First Semester of ten weeks, the Second Semester of ten weeks, and the Summer Term of three weeks.

The First Semester for Division A begins each year on the second Monday in September, and this constitutes the beginning of the school year for all students. The second Summer Term follows the vacation period and closes the official school year.

Attendance

Students are expected to attend all exercises in the subjects they are studying, unless excused by the Registrar. Exercises are held, and students are in general expected to devote themselves to the work of the School, between 9:00 a.m. and 5:00 p.m., with a one-hour lunch period, on every week day except Saturday. Saturday classes are held only between 9:00 a. m. and 1:00 p.m.

Four-Year Curriculums

The School offers four-year college curriculums of study, in co-operation with engineering firms, in the following branches of engineering, leading to the Bachelor's degree:

1. Civil Engineering.
2. Mechanical Engineering.
3. Electrical Engineering.
4. Chemical Engineering.
5. Administrative Engineering.

Descriptions of the curriculums and schedules showing the subjects of instruction included will be found on succeeding pages.

Tuition Fees

The tuition fee in each curriculum is one hundred and seventy-five dollars ($175) a year for each of the four years.

The tuition for freshmen is payable as follows:

Division A

School Periods	*Tuition Due*
Sept. 11, 1922, to Jan. 27, 1923	$60 Sept. 11, 1922
and	$50 Nov. 20, 1922
Aug. 20, 1923, to Sept. 8, 1923	$50 Jan. 22, 1923
	$15 Aug. 20, 1923

Division B

School Periods	*Tuition Due*
Jan. 29, 1923, to June 15, 1923	$60 Jan. 29, 1923
and	$50 April 9, 1923
June 18, 1923, to July 7, 1923	$50 June 11, 1923
	$15 July 2, 1923

The tuition for upperclassmen is payable as follows: sixty dollars ($60) at the beginning of the first school period; fifty dollars ($50) at the beginning of the second school period; fifty dollars ($50) at the beginning of the third school period, and fifteen dollars ($15) at the beginning of the summer term.

All students who were in attendance at the School June 1, 1920, will be permitted to complete their courses of study at the same rate of tuition as was charged when they first registered in the school. The tuition fee for all such students in the four-year curriculums is payable as follows: sixty dollars ($60) at the beginning of the first school period; thirty-five dollars ($35) at the beginning of the second school period; thirty dollars ($30) at the beginning of the third school period.

Full-Time Students

Students attending school in both division A and B during the first and second semesters are charged a minimum additional tuition fee of twenty-five dollars ($25) a semester in addition to the regular yearly rate. Such students who are registered for more than sixteen hours of school work a semester, over and above the amount of work prescribed in the catalog for the year in which they are enrolled, are charged one dollar and fifty cents ($1.50) an hour per semester for each hour above sixteen. In computing additional hours, the catalog schedules are used and both hours of exercises and hours of preparation are counted. Students not on a

full-time basis, but taking extra work, will be charged at the rate of one dollar and fifty cents ($1.50) an hour per semester for all work in excess of the regular schedule.

Students who attend both summer terms in any one summer are charged an additional tuition fee of twenty-five dollars ($25) for the second summer term. The tuition for special students in the summer terms is twenty-five dollars ($25) a term.

Failure to make the required payments on time renders the student liable to be barred from his classes or suspended from Engineering Practice until the matter has been adjusted with the Bursar.

The yearly tuition fee includes the $5.00 membership in the Boston Y. M. C. A. This fee is not included in the tuition for special summer term students.

Laboratory Fees and Deposits

CHEMICAL LABORATORY

All students taking chemical laboratory work are required to make a deposit of five dollars ($5) at the beginning of each year, from which deductions are made for breakage and destruction of apparatus in the laboratory. Any unused portion of this deposit is returned to the student at the end of the school year. In case the charge for such breakage or destruction of apparatus is more than five dollars ($5), the student is charged the additional amount.

Students enrolled in the curriculums in Chemical Engineering will be charged a laboratory fee in accordance with the following rates:

	Course	*Fee*
41-2	Inorganic Chemical Laboratory	$5.00
42-2	Qualitative Analysis Laboratory	10.00
43-2 and 44-2	Quantitative and Technical Analysis combined	5.00
45-2	Organic Chemical Laboratory	10.00
45-4	Organic Chemical Laboratory	5.00
47-2	Industrial Chemical Laboratory	5.00

ELECTRICAL LABORATORY

Students taking electrical laboratory work will be charged a laboratory fee in accordance with the following rates:

	Course	Fee
30-4	Applied Electricity Laboratory	$5.00
32-4	Electrical Engineering II Laboratory	5.00
32-6	Electrical Engineering III Laboratory	5.00
32-8	Electrical Engineering IV Laboratory	10.00
32-2	Electrical Measurements Laboratory	5.00

PHYSICS LABORATORY

Students taking courses in the physics laboratory will be charged a laboratory fee of $2.00 per year.

ENGINEERING LABORATORY

Students taking courses in engineering laboratory will be required to pay a laboratory fee of $2.00 per year.

TESTING MATERIALS LABORATORY

Students enrolled in the course in testing materials laboratory are charged a laboratory fee of $2.00 per year.

Student Activities Fee

Each student in the School is charged a Student Activities Fee of fifteen dollars ($15). Ten dollars of this fee is payable at the time of registration and is non-returnable, five dollars is payable with the third payment of tuition. This fee supports certain student activities, and includes membership in the *Northeastern Engineering Athletic Association*, subscription to the *Northeastern Tech*, the school paper, and subscription to the *Cauldron*, the college year book. The services of a physician are also available under this fee. Only minor ailments, however, are treated. Should the student show signs of more serious illness, he is immediately advised to consult a specialist or return to his home, where he can get more adequate treatment.

Payments

All payments should be made to Galen D. Light, Bursar.

All checks should be made payable to The Bursar, Northeastern College.

Refunds

As the College assumes the obligation of carrying the student throughout the year when the student registers, and as

the College provides the instruction and accommodations on a yearly basis, the Committee on Refunds has ruled as follows:

A. Applications for refunds must be presented within sixty days after withdrawal from school.

B. Credits or refunds may be granted only as stated below:

1. If the reasons as set forth in the application meet with the approval of the Committee on Refunds, the unused portion of the tuition paid by the applicant may be placed in suspense and used at some future time by the applicant to apply upon tuition in any school in Northeastern College, provided it is used within two years.

2. Cash refunds may be granted only in cases where students are compelled to withdraw on account of personal illness. The application must be accompanied by a satisfactory certificate from a physician.

Books and Supplies

All supplies may be purchased at the College Book Store at a cost of twenty dollars ($20) to twenty-five dollars ($25) a year. The supplies for the freshman year cost somewhat more than this because a set of drawing instruments must be obtained. The earnings of the students for their services with the cooperating firms considerably exceed the cost of tuition, fees, the cost of books and supplies, and incidental expenses. The purchase of supplies is therefore not a burden to the student.

Elective Subjects

Students electing any course not included in their curriculum will be required to take all examinations in that course and to attain a passing grade in it before they will be eligible for a degree.

Status of Students

The ability of students to continue their courses is determined by means of daily work and examinations, but regularity of attendance and faithfulness to daily duties are considered equally essential.

When a student elects a curriculum, he is required to

complete all courses included therein in order to be graduated. No subject is to be dropped, or omitted, without the consent of the Committee on Scholarship and the approval of the Dean.

Any student failing to make a satisfactory record, either in school or practical work, may be removed from his position in practical work, or from the School.

Students transferring from approved colleges will be admitted to advanced standing provided that their record warrants such a procedure. Whenever a student enters with advanced standing and it is found that he shows inadequate preparation in any of his pre-requisite subjects, the faculty reserves the right to require the student to repeat in class the subjects in question.

A special student is permitted to attend the School, subject to the approval of the faculty, and to take such courses as the School offers. Special students are not eligible for a degree.

Examinations

Examinations covering the work of the term are usually held at the close of each term. Exceptions may be made in certain courses where, in the opinion of the instructor, examinations are not necessary.

Condition examinations for all courses are given during the week immediately following the last week of the Summer Term for Division A, and during the week preceding the Summer Term for Division B. Condition examinations are not given for courses in which no final examination was given. Special examinations can be arranged for only by vote of the Committee on Scholarship, and for all such examinations the college requires the payment of a special fee of five dollars ($5).

Probation

Students are placed on probation either by the Executive Committee or the Committee on Scholarship. Failure to show proper respect for constituted authority; infringement of the rules and regulations of the college; disregard of obligations to a co-operative firm, etc., constitute insubordination. All matters of insubordination are handled by

the Executive Committee and the penalty for such may be probation.

Failure to meet the standards set by the Committee on Scholarship, unless the failure is supported by causes wholly beyond the student's control, will necessitate the committee placing the student on probation.

Removal from probation is in the hands of the committee placing the student thereon.

Rules of Standing in Scholarship

A student's grade is officially recorded by letters and percentages, as follows:

A, excellent, 90–100 per cent.
B, good, 80–89 per cent.
C, fair, 70–79 per cent.
D, passable, 60–69 per cent.
E, work incomplete or unsatisfactory, 40–59 per cent.
F, complete failure, below 40 per cent.

A mark of E in any particular subject entitles the student to make up the unsatisfactory work, or to take a condition examination. This letter is given for all grades below 60 per cent on intermediate reports.

A mark of F denies the privilege of taking a condition examination, and the course must be repeated.

A student who does not remove a condition before that course is repeated a year later must take the course over again. A condition in more than one subject involves the loss of the privilege of being a candidate for graduation with the student's class, and may involve the loss of assignment to Engineering Practice.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

No student may qualify as a candidate for a degree in any given year unless clear in all the required subjects of the lower years of his chosen curriculum. He must also be in good standing in all courses for which he is enrolled.

Entrance requirements or preparatory subjects pursued in the School are considered as required school work.

Absences

No "cuts" are allowed, and a careful record of attendance upon exercises is kept for each student. Absence from exercises regularly scheduled in any subject will seriously affect the standing of a student, and may cause the removal of the subjects from which he is absent from his schedule and the listing of these subjects as conditioned subjects. In case he presents a reasonable excuse for the absence, however, he may be allowed to make up the time lost and be given credit for the work; but he must complete the work at such time and in such manner as his instructor in the course, with the approval of the head of his department, shall designate. Laboratory work lost can be made up only when it is possible to arrange for the necessary time during hours when these departments are open for regularly scheduled instruction. Absences from exercises immediately preceding or following a recess are especially serious and entail severe penalizing.

Attendance at all mass meetings of the student body is compulsory. Exceptions to this rule are made only when the student has received permission from the Registrar, previous to the meeting from which he desires to be absent.

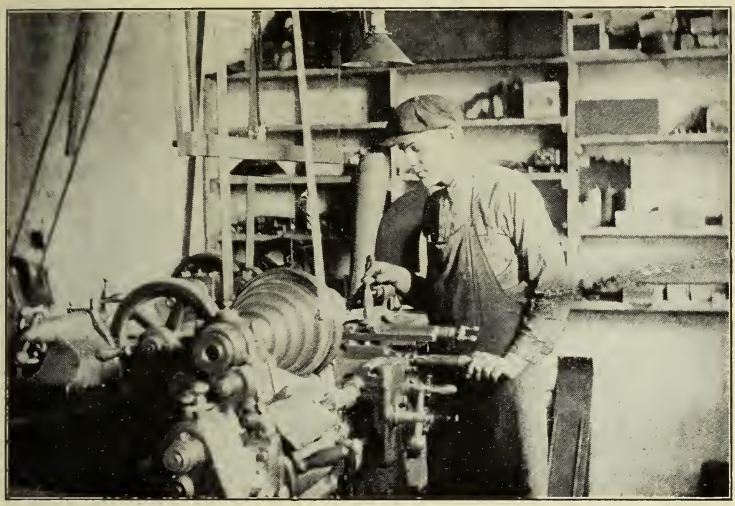
Reports of Standing

Reports of standing of all students are issued four times a year, which will be at the end of each five-week school period. In addition to these regular periods, a special report on the subjects taken during the summer term will be issued immediately at the close of the summer term. All questions relative to marks are to be discussed with the student's faculty advisor, who, in turn, will make all necessary recommendations to the Committee on Scholarship, through the head of his department.

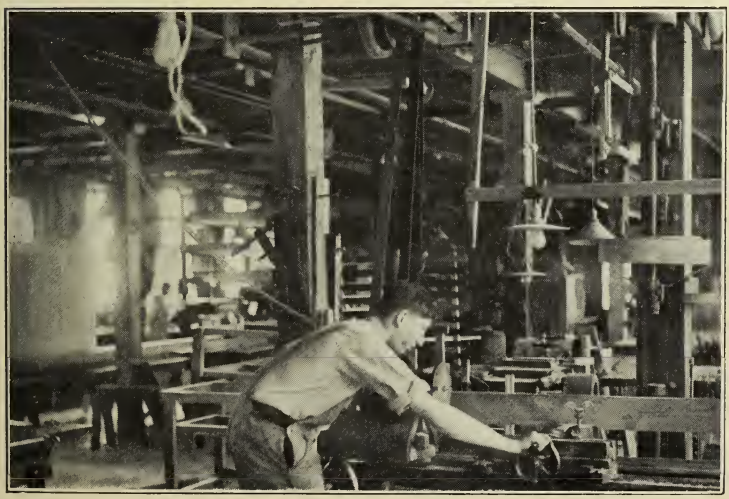
Every effort is made to keep the student up in his studies. Parents and students are always welcomed by the Dean and advisors for conference upon such matters. Special reports on a student's work will be sent to parents at any time, upon request.

Parents or guardians will be notified in all cases when students are advised, or required, to withdraw from the School.

Mechanical Engineering Students

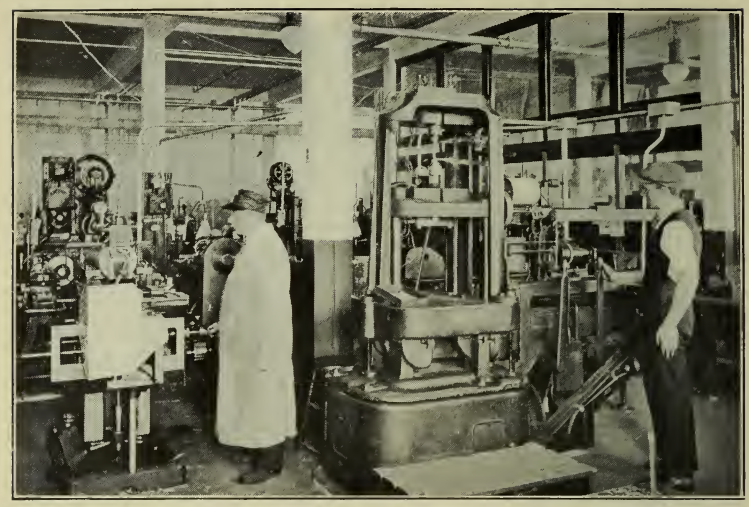


Operating a Lathe
H. G. Butt Mfg. Company

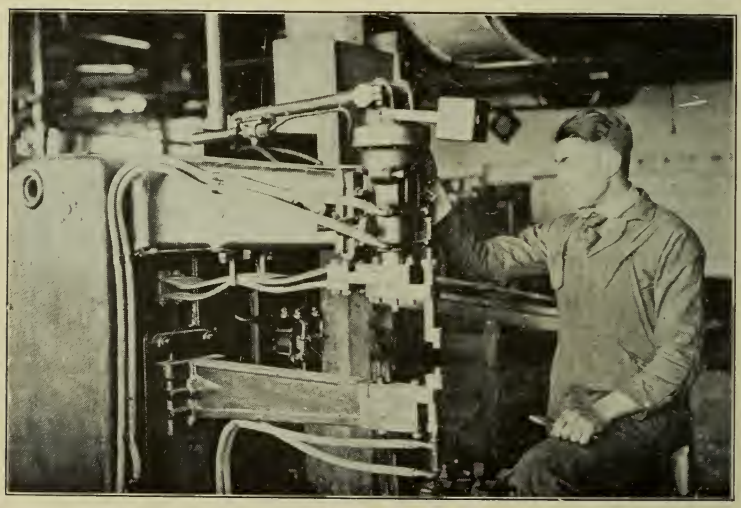


Wood Turning
Dennison Mfg. Co., Framingham

Electrical Engineering Students



Making Tensile Tests on Steel
General Electric Company, Lynn



Operating a Spot Welder
United Shoe Machinery Company, Beverly

Conduct

It is assumed that students come to the School for a serious purpose, and that they will cheerfully conform to such regulations as may from time to time be made. In case of injury to any building, or to any of the furniture, apparatus, or other property of the School, the damage will be charged to the student, or students, known to be immediately concerned; but if the persons who caused the damage are unknown, the cost for repairs may be assessed equally upon all the students of the School.

Students are expected to behave with decorum, to obey the regulations of the School, and to pay due respect to its officers. Conduct inconsistent with the general good order of the School, or persistent neglect of work, if repeated after admonition, may be followed by dismissal, or, in case the offense be a less serious one, the student may be placed upon probation. The student so placed upon probation may be dismissed if guilty of any further offense.

It is desired to administer the discipline of the School so as to maintain a high standard of integrity and a scrupulous regard for truth. The attempt of any student to present, as his own, any work which he has not performed, or to pass any examination by improper means, is regarded as a most serious offense, and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is also held to be a grave breach of discipline.

Advisors

Upon entering the School each student is assigned to a faculty member as his Advisor, who takes an active interest in the student's welfare from all points, and not only guides and assists him in the satisfactory pursuit of his studies, but keeps a close watch on all matters which might tend to hamper the student in his College life, and sees that such hampering does not occur so far as possible.

In the upper years the function of the Advisor is somewhat different and tends more toward consultation and suggestions bearing on the student's plans and probable work after graduation.

STUDENT ACTIVITIES

A moderate participation in social and athletic activities is encouraged by the Faculty, although a standard of scholarship which is incompatible with excessive devotion to such pursuits is required of the students.

Student Activities Committee

The student body has organized a number of groups, or clubs, all of which come under the jurisdiction of the Student Activities Committee. This committee consists of students elected from the various classes, and has general supervision over all social functions of the School. The committee has opened a Student Activities Room, a club room for all members of the School, in which current periodicals, magazines, and engineering books of interest to the young engineer are available for the student's use during his leisure moments. The committee has also formed the Musical Clubs, which consist of an orchestra, a band, a banjo and mandolin club, and a glee club. In order to provide for the social intercourse of the students, as well as to enable the men in the different divisions to meet one another, socials and entertainments are held for their exclusive enjoyment.

The Northeastern Engineering Athletic Association

The Athletic Association consists of all members of the School. At the head of the association is a General Athletic Committee, consisting of the Faculty Committee on Athletics and members elected from the student body. This committee has complete charge of all athletics. Under the guidance of efficient athletic coaches, track, basketball, swimming, and baseball teams are formed and schedules are arranged with other colleges for home games and games abroad. The association also encourages wrestling, interclass baseball and football, and tennis teams. Interclass and interdivision meets are held, as well as a field day near the close of the college year.

The "Northeastern Tech."

The students issue a weekly paper called the *Northeastern Tech.* Here the students have an opportunity to express

their opinions on subjects relating to study, engineering practice, social events, or topics of the day. In addition, pertinent articles by prominent men, as well as college notes and information, make this feature of student activities very valuable. Positions on the editorial staff of the paper are attained by competitive work.

Professional Society

The students in the various courses are organized as a professional society known as the Northeastern College Engineering Society for the closer association of the students of the school, and for the discussion and consideration of various problems and new knowledge in the Engineering Field. Meetings are held every few weeks, at which the members are addressed by engineers and other men of prominence.

There are four sections of the society, the Civil Engineering Section, the Mechanical Engineering Section, the Electrical Engineering Section, and the Chemical Engineering Section. These sections are affiliated either by individual membership or as sections with the Boston Society of Civil Engineers, the American Chemical Society, or the American Institute of Electrical Engineers, thereby procuring for the individual that most valuable association with the successful practicing engineers of the community, and the various problems discussed by them.

"The Cauldron"

"The Cauldron" is the year book of the School. The Senior Class is responsible for its publication, and the members of the staff are chosen through competitive work. The book is ready for distribution in the latter part of the second semester. It contains the usual review of the year's work and activities, a complete history of all classes in the School, all their functions, socials, etc. It also contains a complete individual history of the entire graduating class and is a souvenir highly prized in later years by all graduates.

Student Activities Fund Committee

In order to finance the foregoing student activities, this Student Activities Fund Committee has been formed, and

consists of elected representatives from the Student Activities Committee, the Northeastern Engineering A. A., and the *Northeastern Tech.* This committee apportions the Student Activities Fee among the various activities. Thus the Musical Clubs, the Student Activities Room, the athletic teams, and the college paper are supported by proper apportionment of the fifteen-dollar fee paid by each student at the beginning of the college year.

Student Council

This is the student governing body, and comprises the leaders of the various classes, organizations, clubs, and teams. It acts as a supreme student governing body. It has jurisdiction, under proper supervision of the Faculty, over all student matters, as customs, privileges, or such other matters which can properly be decided upon by such a body.

The Pan-Hellenic Council

A representative from each fraternity, as well as an elected non-fraternity man from each division, make up the Pan-Hellenic Council. It has preliminary jurisdiction over laws governing the regulation of fraternities and clubs in the College.

Annual Prizes

Prizes are awarded annually at the School of Engineering for excellence in the various departments of school activities. It is the aim of the college that such prizes should stimulate the interest of the student to attain a high proficiency in some branch of undergraduate endeavor. The prizes are as follows:

Public Speaking.—Cash prizes of fifty, twenty-five, and ten dollars respectively are offered yearly for excellence in the presentation of original speeches before the college at a regular student mass meeting. All students are eligible to compete for these prizes. The regulations for the contests are published in the *Northeastern Tech* early in the year.

Engineering Conference.—The Department of Engineering Practice annually awards a silver loving cup to the man in each of the professional sections who delivers the

best talk before a regular Conference meeting upon an engineering topic during the year. All regular students, with the exception of freshmen, may compete for these cups.

Thesis.—To the senior who presents the best thesis for graduation a gold medal is awarded at the end of the college year. As each senior is required to submit a thesis before receiving a degree, the purpose of the prize is not to stimulate interest in this important part of a senior's curriculum, but to afford recognition to the man who has done unusually excellent work in meeting the thesis requirements.

Athletics.—A gold medal is presented annually by the School of Engineering to that senior who has made the best all-around athletic record while at the School of Engineering, provided he has been in the school for at least three years.

REQUIREMENTS FOR GRADUATION

The School grants the degrees of:

Bachelor of Civil Engineering.
Bachelor of Mechanical Engineering.
Bachelor of Electrical Engineering.
Bachelor of Chemical Engineering.

To receive the degree of the School the student must attend the School not less than one year, which must be that immediately preceding his graduation. He must complete the prescribed studies of the four years, and must, also, pass final examinations, if required, on subjects included in his curriculum. In addition to this, he must complete satisfactorily a schedule of Engineering Practice under the supervision of the Faculty. The student must, also, prepare a thesis as defined elsewhere in this catalog. All theses and records of work done in preparation of theses, are the permanent property of the School.

The degree of the School represents not only the formal completion of the subjects in the selected course of study, but also the attainment of a satisfactory standard of general efficiency. Any student who does not show in the fourth-year work of his curriculum that he has attained such a standard,

may be required, before receiving the degree, to take such additional work as shall prove his ability. A fee of ten dollars ($10) is required of all candidates for a degree. This fee must be paid at the beginning of the second semester.

POSITIONS HELD BY GRADUATES

The graduates of the School have been able to secure positions of the same grade, commanding the same salaries, as the graduates of other good technical schools. Among the positions now filled by graduates of the School are: Construction engineers, electrical engineers, power plant engineers, designing draftsmen, State and Federal employees under the Civil Service, and instructors. The success of those who have been graduated from the School is the best evidence of the value and thoroughness of the training offered.

PROGRAM OF STUDIES

General Statement

The curriculums of the various Engineering Departments are given on the following pages. The first year, it will be observed, is practically the same in all cases. A few exceptions are made in curriculums where students need some special elementary training in their professional subjects, in order that they may be of more use to their employers in their Engineering Practice.

The school year comprises twenty-three weeks of class work for each division. The twenty-three weeks are divided into two terms of ten weeks each, called the First Semester and Second Semester, and a Summer Term of three weeks. In the curriculums, each course is followed by two numbers: the first number, under the column marked "Ex," indicates the number of hours of "exercise" in recitation, laboratory, drawing room, or field work a week; the second number, under the column marked "Prep," indicates the number of hours of outside "preparation" that have been assigned as the minimum weekly requirement for each course. The work is so planned that the student will be required to spend from forty-eight to fifty-two hours a school week in preparation and class work.

The number preceding each course in the schedule of the various curriculums is an index number to the description of the content of the subject in the Synopsis of Courses.

Those courses preceded by 0 indicate general subjects. The work which is under the direction of the General Departments is designated as follows: 01, Department of English; 02, Department of Mathematics; 03, Department of Physics; and 04, Department of Drawing, etc.

The subject numbers beginning with 1 indicate subjects belonging strictly to the Department of Civil Engineering; subject numbers beginning with 2, to the Department of Mechanical Engineering; 3, to the Department of Electrical Engineering; 4, to the Department of Chemical Engineering; and 5, to the Department of Administrative Engineering.

CIVIL ENGINEERING

The Civil Engineering curriculum is designed to give the student a broad education in those subjects which form the basis of all branches of technical education, and a special training in those subjects comprised under the term "Civil Engineering." The student receives a sound training, both theoretical and practical, in the sciences upon which professional practice is based.

Civil Engineering covers such a broad field that no one can become expert in its whole extent. It includes topographical engineering, municipal engineering, railroad engineering, structural engineering, and hydraulic and sanitary engineering. It covers land surveying, the building of railroads, harbors, docks, and similar structures; the construction of sewers, waterworks, roads and streets; the design and construction of girders, roofs, trusses, bridges, buildings, walls, foundations, and all fixed structures. All of these branches of engineering rest, however, upon a relatively compact body of principles, and in these principles the students are trained by practice in the class room, drawing room, the field, and the testing laboratory.

The curriculum is designed to prepare the young engineer to take up the work of the design and construction of structures, to aid in the location and construction of steam and electric railways, and to undertake intelligently supervision of work in the allied fields of mining, architectural, and electrical engineering, and general contracting.

CURRICULUM I. CIVIL ENGINEERING

FIRST YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
020-1	College Physics	3	6
021-1	Trigonometry	4	6
030-1	Physics	2	4
041-1	Mechanical Drawing	5	0
060-1	Physical Training	2	0
11-1	Surveying	2	4
11-3	Surveying, F. & P.	5	0

	SECOND SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
022-1	Analytic Geometry	4	6
031-1	Physics	4	8
034-1	Physics Laboratory	2	2
041-2	Mechanical Drawing	4	0
060-1	Physical Training	2	0
11-2	Surveying	2	4
11-4	Surveying, F. & P.	5	0

SUMMER TERM

012-1	History of Science	5	10
043-1	Descriptive Geometry	20	10

SECOND YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
023-1	Differential Calculus	4	6
032-1	Light	3	3
034-2	Physics Laboratory	2	2
050-1	Engineering Conference	2	0
11-5	Surveying	2	4
11-6	Surveying, F. & P.	5	0
21-1	Applied Mechanics	3	6
30-1	Elements of Electricity	3	3

	SECOND SEMESTER	Hours per week Ex.	Prep.
023-2	Integral Calculus	3	6
033-1	Heat	3	4
034-3	Physics Laboratory	2	2
050-1	Engineering Conference	2	0
12-1	Railroad Surveying	3	4½
12-2	Rrd. Surveying, F. & P.	5	0
21-2	Applied Mechanics	3	6
30-3	Applied Electricity	3	3

SUMMER TERM

30-4	Applied Electricity Laboratory	15	30

THIRD YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
013-1	Government	2	4
050-1	Engineering Conference	2	0
11-8	Topographical Drawing	3	0
12-3	Railroad Engineering	2	4
12-4	Rrd. Engineering, F.& P.	5	0
13-1	Hydraulics	3	6
16-4	Geology	2	4
21-3	Strength of Materials	3	6

	SECOND SEMESTER	Hours per week Ex.	Prep.
014-1	Economics	2	4
050-1	Engineering Conference	2	0
14-1	Theory of Structures	3	6
14-2	Structural Drawing	3	0
16-2	Testing Materials Lab.	2	2
21-3	Strength of Materials	3	6
23-3	Heat Engineering	3	6
40-1	Inorganic Chemistry	4	4

SUMMER TERM

042-5	Engineering Drawing	25	20

FOURTH YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	3
14-3	Engineering Structures	6	9
14-4	Structural Design	6	3
15-1	Concrete	2	4
15-2	Concrete Design	3	0
16-1	Materials	2	4
16-3	Foundations	2	2

	SECOND SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	6
14-3	Engineering Structures	6	9
14-4	Structural Design	6	3
15-1	Concrete	2	4
15-2	Concrete Design	3	0
17-1	Highway Engineering	2	4

MECHANICAL ENGINEERING

The Mechanical Engineering Curriculum is designed to give the student a broad foundation in those fundamental subjects which form the basis for all professional engineering practice, and especially to equip the young engineer with a knowledge of the various phases of Mechanical Engineering. The curriculum embraces instruction by text-book, lecture, laboratory, and workshop practice, with special reference to the following branches: applied mechanics, heat engineering, industrial engineering, hydraulic engineering, applied electricity, and machine design.

The instruction aims to develop in the student the ability to think clearly and logically in the application of fundamental principles to engineering problems. The class-room work in the professional subjects is arranged with due regard to modern industrial conditions, in order that the student may connect theory with practice and appreciate the necessity of both in order to become a successful engineer. With this in view, special courses are given involving a discussion of problems which have presented themselves to the students and requiring a familiarity with the contents of current engineering periodicals. At all times it is sought to develop self-confidence in the student, and he is encouraged to take the initiative.

CURRICULUM II. MECHANICAL ENGINEERING

FIRST YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
020-1	College Algebra	3	6
021-1	Trigonometry	4	6
030-1	Physics	2	4
041-1	Mechanical Drawing	5	0
060-1	Physical Training	2	0
24-1	Production Engineering	2	3
40-1	Inorganic Chemistry	4	4

	SECOND SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
022-1	Analytic Geometry	4	6
031-1	Physics	4	8
034-1	Physics Laboratory	2	2
041-3	Mechanical Drawing	9	0
060-1	Physical Training	2	0
24-2	Production Engineering	2	3

SUMMER TERM

012-1	History of Science	5	10
043-1	Descriptive Geometry	20	10

SECOND YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
023-1	Differential Calculus	4	6
032-1	Light	3	3
034-2	Physics Laboratory	2	2
042-3	Machine Drawing	6	0
044-2	Mechanism	2	4
050-1	Engineering Conference	2	0
21-1	Applied Mechanics	3	6
30-1	Elements of Electricity	3	3

	SECOND SEMESTER	Hours per week Ex.	Prep.
023-2	Integral Calculus	3	6
033-1	Heat	3	4
034-3	Physics Laboratory	2	2
044-3	Mechanism	6	6
050-1	Engineering Conference	2	0
21-2	Applied Mechanics	3	6
30-3	Applied Electricity	3	3

SUMMER TERM

30-4	Applied Electricity Laboratory	15	30

THIRD YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
013-1	Government	2	4
050-1	Engineering Conference	2	0
13-1	Hydraulics	3	6
21-3	Strength of Materials	3	6
22-1	Graphical Analysis	6	3
23-1	Heat Engineering	3	6
24-3	Power Plant Equipment	2	4

	SECOND SEMESTER	Hours per week Ex.	Prep.
014-1	Economics	2	4
050-1	Engineering Conference	2	0
13-2	Hydraulic Motors	2	4
21-3	Strength of Materials	3	6
22-2	Machine Design	6	3
22-5	Mechanism of Machines	3	3
23-1	Heat Engineering	3	6

SUMMER TERM

23-4	Steam Turbines	5	10
23-6	Engineering Laboratory	15	15

FOURTH YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	3
15-1	Concrete	2	4
15-2	Concrete Design	3	0
16-1	Materials	2	4
22-3	Machine Design	6	3
23-5	Heat Engineering	3	6
25-1	Industrial Plants	4	6

	SECOND SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	6
15-1	Concrete	2	4
15-2	Concrete Design	3	0
22-3	Machine Design	6	3
24-4	Power Plant Engineering	3	6
24-6	Standard Eng. Products and Processes	2	4
25-1	Industrial Plants	6	3

ELECTRICAL ENGINEERING

Probably none of the branches of scientific knowledge has been so markedly modified during the past decade as that relating to Electricity, nor has any other exerted such a profound influence upon the scientific thought of the period. A science, like a planet, grows in the main by a process of infinitesimal accretion. Its theory is built like a cathedral through the addition by many builders of many different elements, and this is pre-eminently true of Electricity. It is absolutely essential that the electrical engineer who hopes to make a success of his work should be able to grasp readily and absorb effectively the meaning and content of the many scientific memoirs recording the results of research bearing upon and directly influencing his chosen branch of engineering.

He must have a thorough appreciation of physical theory, a clear understanding of chemical principles, and a broad working knowledge of mathematics. It is essential that each student planning to take this curriculum should realize the fundamental necessity of obtaining a solid grounding in these three subjects upon which the success of his future work will definitely hinge, nor can he be too strongly urged to include physics in his high school preparatory course if he hopes to avoid difficulty in the earlier years.

It is not the purpose of the curriculum to attempt the impossible in aiming to turn out electrical engineers, fully trained in all the branches of the science, especially as it is becoming daily more differentiated and specialized. The curriculum is designed rather to lay a broad and secure foundation for future progress along the lines of activity which may particularly appeal to each individual student and give him a good working knowledge of the essential principles which underlie each of the more specialized branches of professional work.

Parallel with the theoretical work runs a carefully planned course of laboratory instruction which is intended to develop the student's power of accurate observation, of planning work and methods of procedure for himself with due regard to saving of time and labor and precision of the results attained.

CURRICULUM III. ELECTRICAL ENGINEERING

FIRST YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
020-1	College Algebra	3	6
021-1	Trigonometry	4	6
030-1	Physics	2	4
041-1	Mechanical Drawing	5	0
060-1	Physical Training	2	0
31-1	Elements of Elect. Eng.	2	3
40-1	Inorganic Chemistry	4	4

	SECOND SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
022-1	Analytic Geometry	4	6
031-1	Physics	4	8
034-1	Physics Laboratory	2	2
041-3	Mechanical Drawing	9	0
060-1	Physical Training	2	0
32-1	Elect. Eng. I	4	4

SUMMER TERM

012-1	History of Science	5	10
043-1	Descriptive Geometry	20	10

SECOND YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
023-1	Differential Calculus	4	6
032-1	Light	3	3
034-2	Physics Laboratory	2	2
050-1	Engineering Conference	2	0
21-1	Applied Mechanics	3	6
32-3	Elect. Eng. II	3	6
32-4	Elect. Eng. II Lab.	6	3

	SECOND SEMESTER	Hours per week Ex.	Prep.
023-2	Integral Calculus	3	6
033-1	Heat	3	4
034-3	Physics Laboratory	2	2
050-1	Engineering Conference	2	0
21-2	Applied Mechanics	3	6
32-3	Elect. Eng. II	4	6
32-4	Elect. Eng. II Lab.	6	3

SUMMER TERM

042-5	Engineering Drawing	25	20

THIRD YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
013-1	Government	2	4
050-1	Engineering Conference	2	0
21-4	Strength of Materials	3	6
23-1	Heat Engineering	3	6
32-6	Elect. Eng. III Lab.	6	3
32-7	Elect. Eng. III	3	6
33-1	Elect. Measurements	2	3

	SECOND SEMESTER	Hours per week Ex.	Prep.
014-1	Economics	2	4
050-1	Engineering Conference	2	0
13-3	Hydraulics	2	4
23-1	Heat Engineering	3	6
32-6	Elect. Eng. III Lab.	6	3
32-7	Elect. Eng. III	3	6
33-1	Elect. Measurements	2	3
33-2	Elect. Measurements Lab.	3	0

SUMMER TERM

33-2	Elect. Measurements Lab.	25	20

FOURTH YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	3
13-2	Hydraulic Motors	2	4
23-2	Engineering Laboratory	2	2
32-8	Elect. Eng. IV Lab.	6	3
32-9	Elect. Eng. IV	4	8
34-1	Elect. Eng. V	4	6
35-1	Advanced Electricity	2	3

	SECOND SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	6
24-6	Standard Eng. Products and Processes	2	4
32-8	Elect. Eng. IV Lab.	6	3
32-9	Elect. Eng. IV	4	8
34-1	Elect. Eng. V	4	6
35-1	Advanced Electricity	2	3

CHEMICAL ENGINEERING

The efficiency of any industrial chemical enterprise depends not only upon a knowledge of the chemical reactions forming the basis of the process, but also upon a knowledge of the mechanical principles on which depend the design, construction and maintenance of the plant for the carrying on of these reactions. Owing to the keen competition among industries which must follow the abnormal war-time production, it will be necessary to maintain the highest possible efficiency.

The purpose of this curriculum is to prepare students capable of filling the demand for trained men competent to build and operate manufacturing industries based upon chemical principles at their maximum efficiency. The professional work of the curriculum falls naturally into three groups: First, courses which provide a knowledge of the fundamental principles of chemistry. Second, those courses which furnish a knowledge of mechanical engineering. Third, engineering practice in which the student becomes familiar with the many applications of theoretical principles.

The laboratory work has been planned not only to familiarize the student with many types of chemical compounds and apparatus, but also to train the student to be an exact and logical thinker, and to encourage a desire for the application of his knowledge and training to the investigation and solution of the many problems which modern industry presents.

CURRICULUM IV. CHEMICAL ENGINEERING

FIRST YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
020-1	College Algebra	3	6
021-1	Trigonometry	4	6
030-1	Physics	2	4
041-1	Mechanical Drawing	5	0
060-1	Physical Training	2	0
41-1	Inorganic Chemistry	4	4
41-2	Inorganic Chemistry Lab.	5	0

	SECOND SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
022-1	Analytic Geometry	4	6
031-1	Physics	4	8
034-1	Physics Laboratory	2	2
041-2	Mechanical Drawing	4	0
060-1	Physical Training	2	0
41-1	Inorganic Chemistry	4	4
41-2	Inorganic Chemistry Lab.	5	0

SUMMER TERM

42-1	Qualitative Analysis	10	20
42-2	Qualitative Analysis Lab.	28	0

SECOND YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
023-1	Differential Calculus	4	6
032-1	Light	3	3
034-2	Physics Laboratory	2	2
050-1	Engineering Conference	2	0
21-1	Applied Mechanics	3	6
30-1	Elements of Electricity	3	3
43-1	Quantitative Analysis	2	4
32-2	Quantitative Analy. Lab.	5	0

	SECOND SEMESTER	Hours per week Ex.	Prep.
011-1	German	2	4
023-2	Integral Calculus	3	6
033-1	Heat	3	4
034-3	Physics Laboratory	2	2
050-1	Engineering Conference	2	0
21-2	Applied Mechanics	3	6
30-3	Applied Electricity	3	3
43-2	Quant. Analysis Lab.	5	0

SUMMER TERM

30-4	Applied Electricity Laboratory	15	30

THIRD YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
011-2	German	2	2
013-1	Government	2	4
050-1	Engineering Conference	2	0
21-4	Strength of Materials	3	6
44-1	Technical Analysis	3	6
44-2	Technical Analysis Lab.	5	0
45-1	Organic Chemistry	3	6
45-2	Organic Chemistry Lab.	5	0

	SECOND SEMESTER	Hours per week Ex.	Prep.
014-1	Economics	2	4
050-1	Engineering Conference	2	0
13-3	Hydraulics	2	4
23-3	Heat Engineering	3	6
44-3	Technical Analysis	2	4
45-1	Organic Chemistry	3	6
45-2	Organic Chemistry Lab.	5	0
46-2	Chemical Engineering	2	4

SUMMER TERM

042-5	Engineering Drawing	25	20

FOURTH YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	6
45-3	Organic Chemistry	2	6
45-4	Organic Chemistry Lab.	5	0
46-3	Chemical Engineering	3	6
47-1	Industrial Chemistry	3	3
47-2	Industrial Chemistry Lab.	4	0
48-1	Physical Chemistry	4	8

	SECOND SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	6
45-3	Organic Chemistry	2	6
45-4	Organic Chemistry Lab.	5	0
46-3	Chemical Engineering	3	6
47-1	Industrial Chemistry	2	2
47-2	Industrial Chemistry Lab.	4	0
48-1	Physical Chemistry	4	8

ADMINISTRATIVE ENGINEERING

The specialized curriculums for engineering students tend toward specific training of the students in design and construction for railroad, power plant and industrial enterprises. Recently, however, need has been expressed for men capable of handling not only technical, but also administrative problems, for in many cases of technical positions there is a large measure of administrative responsibility also.

The Administrative Engineering curriculum has been planned to provide a training for men who desire a knowledge of both scientific and business principles. The curriculum combines the instruction in engineering subjects with the study of business organization and management, labor problems, business law, and accounting. The course is designed as a groundwork for efficient handling of administrative problems whenever encountered in conjunction with engineering work.

The curriculum is open to students in two options: (1) Civil Engineering and (2) Mechanical Engineering. Those who elect option (1) will have in mind positions with consulting engineers, construction companies, and public service corporations engaged in operating transportation systems, water works, and the like. Students who elect option (2) will have in mind positions with industrial plants manufacturing paper, rubber goods, shoes, cotton and woolen goods, hardware, etc.

Students completing this curriculum satisfactorily with options (1) or (2) will become candidates for the degrees of Bachelor of Civil Engineering or Bachelor of Mechanical Engineering, respectively.

Chemical Engineering Students

Analyzing Metals
General Electric Company, Lynn

Calorimeter Testing
Industrial Engineering Corporation

Civil Engineering Students

Giving Lines and Grades for Concrete Construction
TURNER CONSTRUCTION COMPANY

Triangulation Surveying
NORTHEASTERN COLLEGE

CURRICULUM V. ADMINISTRATIVE ENGINEERING

FIRST YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
020-1	College Algebra	3	6
021-1	Trigonometry	4	6
030-1	Physics	2	4
041-1	Mechanical Drawing	5	0
060-1	Physical Training	2	0
11-7	Surveying	3	3
24-1	Production Engineering	2	3

	SECOND SEMESTER	Hours per week Ex.	Prep.
010-1	English	3	6
022-1	Analytic Geometry	4	6
031-1	Physics	4	8
034-1	Physics Laboratory	2	2
041-3	Mechanical Drawing	9	0
060-1	Physical Training	2	0
24-2	Production Engineering	2	3

SUMMER TERM

012-1	History of Science	5	10
043-1	Descriptive Geometry	20	10

SECOND YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
023-1	Differential Calculus	4	6
032-1	Light	3	3
034-2	Physics Laboratory	2	2
042-3	Machine Drawing	6	0
044-2	Mechanism	2	4
050-1	Engineering Conference	2	0
21-1	Applied Mechanics	3	6
30-1	Elements of Electricity	3	3

	SECOND SEMESTER	Hours per week Ex.	Prep.
023-2	Integral Calculus	3	6
033-1	Heat	3	4
034-3	Physics Laboratory	2	2
044-3	Mechanism	6	6
050-1	Engineering Conference	2	0
21-2	Applied Mechanics	3	6
30-3	Applied Electricity	3	3

SUMMER TERM

30-4	Applied Electricity Laboratory	15	30

THIRD YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
013-1	Government	2	4
050-1	Engineering Conference	2	0
21-3	Strength of Materials	3	6
50-1	Industrial Organization	2	4
51-1	Principles of Accounting	3	6
	OPTION 1		
11-8	Topographical Drawing	3	0
13-1	Hydraulics	3	6
16-4	Geology	2	4
	OPTION 2		
22-1	Graphical Analysis	6	3
23-1	Heat Engineering	3	6

	SECOND SEMESTER	Hours per week Ex.	Prep.
014-1	Economics	2	4
050-1	Engineering Conference	2	0
21-3	Strength of Materials	3	6
50-2	Industrial Finance	2	4
52-1	Banking and Securities	3	6
	OPTION 1		
14-1	Theory of Structures	3	6
14-2	Structural Drawing	3	0
16-2	Testing Materials Lab.	2	2
	OPTION 2		
22-2	Machine Design	6	3
23-1	Heat Engineering	3	6

SUMMER TERM

50-3	Corporations	5	10
51-2	Cost Accounting	10	20

FOURTH YEAR

	FIRST SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	3
50-4	Business Management	3	6
50-5	Marketing	3	6
	OPTION 1		
14-3	Engineering Structures	6	9
14-4	Structural Design	6	3
	OPTION 2		
16-1	Materials	2	4
22-3	Machine Design	6	3
25-1	Industrial Plants	4	6

	SECOND SEMESTER	Hours per week Ex.	Prep.
050-1	Engineering Conference	2	0
052-1	Thesis	1	6
50-6	Business Administration	3	6
53-1	Business Law	2	4
	OPTION 1		
14-3	Engineering Structures	6	9
14-4	Structural Drawing	6	3
	OPTION 2		
13-3	Hydraulics	2	4
24-4	Power Plant Engineering	3	6
25-1	Industrial Plants	6	3

SUBJECTS OF INSTRUCTION

Instruction is given by lectures and recitations, and by practical exercises in the field, in the laboratories, and in the drawing rooms. A great value is set upon the educational effect of these exercises, and they form the foundation of each of the five curriculums. In many branches the instruction given differs widely from available texts in which cases notes on the lectures and laboratory work are usually issued to the students. Besides oral examinations in connection with the ordinary exercises, written examinations are held from time to time.

In the following pages will be found a more or less detailed statement of the scope of the subjects offered in the various curriculums. The subjects are classified, as far as possible, related studies being arranged in sequence. The subjects are numbered for convenience in consulting the various curriculums. A complete table of the Subjects of Instruction will be found at the end of the catalog. Under each subject is given a list of the courses required as preparation for that subject. These requirements are made as it is felt that the student must have become proficient in all these subjects for a clear comprehension of the advanced work. In some cases, the required preparation may be taken simultaneously and must be completed before further advanced work is undertaken.

Students electing any subject must complete that subject in order to be a candidate for a degree.

By careful consideration of the curriculums, in connection with the following Program of Studies, the applicant for a special curriculum may select, for the earlier part of that curriculums, such subjects as will enable him to pursue later those more advanced subjects which he may particularly desire. Applications for exception from the required preparation as stated in connection with each subject described below, will be passed on by the Faculty.

The topics included in the list which follows are subject to change at any time by action of the School authorities.

PROGRAM OF STUDIES

In the following synopses under each subject, "curriculums" refers to the five principal curriculums of Civil I, Mechanical II, Electrical III, Chemical IV, and Administrative V. In the case of curriculum V, V_1 refers to the Civil Engineering option and V_2 to the Mechanical option, and V to both options in which that particular subject is required. The courses themselves are arranged in groups according to the departments under which the course falls.

The "year" refers to the time when the subject is ordinarily taken under the regular schedule, "both semesters" referring to both the First and Second Semesters, and "Summer Term" referring to the three-week term starting in June or in August. "Preparation" gives the courses by number that the student must have taken and passed satisfactorily before he may be permitted to take the course under discussion, except in a few stated cases where the preparation may be taken simultaneously. Under the number of "hours per week," "Ex." refers to the hours of class room or laboratory work, and "Prep." to the hours of outside preparation. The main body of the synopsis shows in a brief form the ground covered by the course. At the end of the synopsis is given the names of the instructors for that particular subject; the first named being in charge.

GENERAL DEPARTMENTS

Liberal Subjects

010-1 ENGLISH

All curriculums — *Preparation: — —*
First year, both semesters — *Three hours per week*

English Composition especially adapted to the needs of men who expect to follow the engineering profession. Watt's "The Composition of Technical Papers" forms the basis of the course. The work consists of lectures, recitations, class discussions, weekly themes, tests, reports, and a limited amount of outside reading, particularly in modern scientific journals. The material for the themes is entirely drawn from, or related to, the student's study in the laboratory and experience in his Engineering Practice with the co-operating firm.

PROFESSOR MELVIN.
MR. JEFFERY.

011-1 GERMAN

Curriculum: IV — *Preparation: — —*
Second year, second semester — *Two hours per week*

All students in the Chemical Engineering Curriculum are required to show before graduation a sufficient knowledge of the German language to be able to read technical books and scientific articles written in the German language. For students who have not obtained this knowledge before entering college, this course will offer a study of grammatical forms, syntax, and vocabulary through composition exercises and rapid reading. The entire purpose is to give the student a knowledge of German grammar with a working vocabulary of scientific terms.

MR. PERKINS.

011-2 GERMAN

Curriculum: IV — *Preparation: 011-1*
Third year, first semester — *Two hours per week*

A continuation of German 011-1.

MR. PERKINS.

012-1 HISTORY OF SCIENCE

Curriculums: I, II, III, V — *Preparation: — —*
First year, summer term — *Five hours per week*

The aim is to give a broad view of the growth of science, extend the range of the student's interests, and encourage discriminating scientific reading. Considerable collateral reading is required of the students.

PROFESSOR DURKEE.

013-1 GOVERNMENT

All curriculums — *Preparation: — —*
Third year, first semester — *Two hours per week*

The theory and practice of government in the existing forms of national organization in the United States and Great Britain. The relations between the executive, the legislature, and the judiciary will form the basis of investigation. In the lectures additional illustrative material will be taken from France, Switzerland, and Canada. It is hoped that the men will look on the study of government, not as academic but as practical, through constant reference to contemporary men and affairs.

PROFESSOR MELVIN.

014-1 ECONOMICS

All curriculums — *Preparation: — —*
Third year, second semester — *Two hours per week*

A rapid survey of the elementary principles of economics, such as those of wealth, labor, capital, value, price, and so forth. Particular attention is paid to the consideration of money, the mechanism of exchange, banking and its relation to the finances of corporations. In studying the distribution of wealth, considerable attention is paid to the questions of wages and value, and their relation to business profits.

PROFESSOR SPEAR.

Mathematics

020-1 COLLEGE ALGEBRA

All curriculums — *Preparation: — —*
First year, first semester — *Three hours per week*

Beginning with quadratic equations, the student has an opportunity to review the various operations of simpler

algebra. A study of the theory of exponents, series, determinants, principles of theory of equations, graphs, permutations and combinations, and principles of vector analysis is also included.

PROFESSORS SPEAR AND COOLIDGE.
MESSRS. GOODRIDGE AND JEFFERY.

021-1 TRIGONOMETRY

All curriculums — *Preparation: 020-1 taken concurrently*
First year, first semester — *Four hours per week*

Trigonometric functions as ratios; transformation and solution of trigonometric equations; inverse functions; circular functions; goniometry; logarithms; solution of exponential equations; solution of right and oblique triangles; law of sines, cosines, and tangents; areas. Considerable practice in calculations of practical problems enable the student to apply his trigonometry to problems arising in Engineering Practice at an early stage. Explanation of laws of spherical trigonometry.

PROFESSORS BENEDICT AND COOLIDGE.
MESSRS. GOODRIDGE, PORTER AND STEARNS.

022-1 ANALYTIC GEOMETRY

All curriculums — *Preparation: 021-1*
First year, second semester — *Four hours per week*

Cartesian and polar co-ordinates. The equations of straight lines and simpler curves derived from the geometric properties of the curves. Properties of curves derived from their equations. Thorough study of straight line, circle, and conic sections. Intersection of curves, transformation of axes. Plotting of polynomials, including exponential, trigonometric, and logarithmic functions. Loci problems. An endeavor is made to develop the analytic sense in the student throughout the course, rather than to rely on the use of formulae.

PROFESSOR SPEAR.
MR. GRAMSTORFF.

023-1 DIFFERENTIAL CALCULUS

All curriculums — *Preparation: 022-1*
Second year, first semester — *Four hours per week*

Theory of limits; rates of change; differentiation of algebraic, trigonometric, exponential, and logarithmic func-

tions; slopes of curves; maxima and minima, with practical problems; partial differentiation; derivatives of higher order; lengths of curves; radius of curvature, etc.; expansion of functions, series.

Although the subject matter deals with considerable theory, constant sight is kept of the practical application of all the theory. The geometric interpretation of every new subject is carefully defined, and problems are continually solved dealing in practical applications of theory. Velocity and acceleration problems in mechanics are typical of those used for application of differentiation.

PROFESSOR SPEAR.

023-2 INTEGRAL CALCULUS

All curriculums — *Preparation: 023-1*
Second year, second semester — *Three hours per week*

A continuation of Calculus, 023-1. Integration as the inverse of differentiation; intergration as a summation; definite integrals; use of tables; double and triple integrals; areas in rectangular and polar co-ordinates; volumes; center of gravity; moment of inertia. Practical problems depending on the differential and integral calculus for solution. Solution of simpler differential equations.

PROFESSOR SPEAR.

Physics

030-1 PHYSICS

All curriculums — *Preparation: — —*
First year, first semester — *Two hours per week*

A course in the fundamental principles of elementary Physics to be taken by students who have not had sufficient preparation for the subsequent courses in Physics. The course includes the principles of mechanics, heat, light, and sound, with problems, lectures, and experiments.

PROFESSOR COOLIDGE.

031-1 PHYSICS

All curriculums — *Preparation: 021-1, 030-1*
First year, second semester — *Four hours per week*

A study of the principles of mechanics, statics, and dynamics. The subjects studied are: equilibrium of bodies acted

upon by parallel forces, equilibrium of bodies acted upon by concurrent forces, vectors, relative velocities, uniform velocity, uniformly accelerated motion, simple harmonic motion, motion on an inclined plane, energy, work, horsepower, angular velocity and acceleration, moment of inertia, kinetic energy of rotation, centrifugal force, fluid pressure, density and specific gravity of solids and liquids, Boyles law, and hydrometers. It is the purpose of the course to lay a thorough foundation for subsequent study of experimental and technical physics. Hence it is planned with immediate reference to familiarize the pupil with the fundamental principles of the science.

PROFESSOR COOLIDGE.
MESSRS. STEARNS, GOODRIDGE AND GRAMSTORFF.

032-1 LIGHT

All curriculums — *Preparation: 021-1, 030-1*
Second year, first semester — *Three hours per week*

The study of Light, including wave motion, mirrors, refraction, lenses, optical instruments, dispersion, interference, diffraction, and polarization of light.

PROFESSOR COOLIDGE.

033-1 HEAT

All curriculums — *Preparation: 030-1*
Second year, second semester — *Three hours per week*

The topics studied are: thermometry, expansion of solids, liquids, and gases, calorimetry, change of state including latent heat of fusion and vaporization (sublimation), triple point diagram, conduction and radiation, and the mechanical equivalent of heat.

PROFESSOR COOLIDGE.

034-1 PHYSICS LABORATORY

All curriculums — *Preparation: 031-1 taken concurrently*
First year, second semester — *Two hours per week*

A series of experiments of an elementary grade for students who are found to be deficient in the simpler fundamentals of Physics.

PROFESSOR COOLIDGE.
MR. STEARNS AND ASSISTANTS.

034-2 PHYSICS LABORATORY

All curriculums — *Preparation: 034-1*
Second year, first semester — *Two hours per week*

Experiments on mechanics performed by each student, supplementing the lecture and class room work in Physics 031-1. The experiments include the use of verniers, micrometers, and spherometers, calculation of true weights, determination of specific gravities of solids by various methods, areas by planimeter, modulus of elasticity, and motion on an inclined plane.

PROFESSOR COOLIDGE.
MR. STEARNS AND ASSISTANTS.

034-3 PHYSICS LABORATORY

All curriculums — *Preparation: 032-1, 033-1 taken concurrently*
Second year, second semester — *Two hours per week*

A series of experiments on Light and Heat to supplement the work done in Physics 032-1 and Physics 033-1. The experiments on Light include the determination of the index of refraction of a lens, the position of images in combinations of lenses, and the uses of the spectrometer and spectroscope. The experiments on Heat include the calibration of a thermometer, determination of the temperature of a mixture, the relations between the pressure and boiling point of water, and the use of the air thermoneter.

PROFESSOR COOLIDGE.
MR. STEARNS AND ASSISTANTS.

Drawing

041-1 MECHANICAL DRAWING

All curriculums — *Preparation: — —*
First year, first semester — *Five hours per week*

An elementary course embracing straight line and compass exercises, geometrical constructions, lettering, orthographic projection and development.

PROFESSORS ASHLEY AND GEE.
MR. GRAMSTORFF.

041-2 MECHANICAL DRAWING

Curriculums: I, IV — *Preparation: 041-1*
First year, second semester — *Four hours per week*

A continuation of Mechanical Drawing 041-1, comprising problems in conic sections, isometric drawing and tracing.

PROFESSORS ASHLEY AND GEE.
MR. GRAMSTORFF.

041-3 MECHANICAL DRAWING

Curriculums: II, III, V — *Preparation: 041-1*
First year, second semester — *Nine hours per week*

A continuation of Mechanical Drawing 041-1 comprising problems in conic sections, isometric drawing, tracing and elementary machine drawing.

PROFESSORS ASHLEY AND GEE.
MR. GRAMSTORFF.

042-3 MACHINE DRAWING

Curriculums: II, V — *Preparation: 041-3*
Second year, first semester — *Six hours per week*

Reading and translating drawings. Detailed and assembly drawings of machine parts and simple machines are made from freehand sketches and other data, but nothing in the nature of a copy is permitted. Designed to give a thorough foundation for the study of machine design.

PROFESSORS ASHLEY AND GEE.
MR. GRAMSTORFF.

042-5 ENGINEERING DRAWING

Curriculums: I, III, IV* — *Preparation: 041-2* or *041-3*
Third year, summer term — *Twenty-five hours per week*

This course comprises problems in mechanical and freehand perspective, elementary machine drawing, freehand machine sketching and problems and class room discussions on simple mechanism of machines.

PROFESSOR ASHLEY.

*Second year, summer term.

043-1 DESCRIPTIVE GEOMETRY

Curriculums: I, II, III, V — *Preparation: 041-1*
First year, summer term — *Twenty hours per week*

A study of the principles of descriptive geometry and their application to engineering by the solution of many problems in which theory and practice are closely correlated. Classroom exercises are devoted entirely to drafting board problems, preparation for which is obtained by the outside study of text-book references and practical problems.

PROFESSORS ASHLEY AND GEE.

044-2 MECHANISM

Curriculums: II, V — *Preparation: 041-3*
Second year, first semester — *Two hours per week*

An introductory course conducted mainly by graphical methods and dealing with gear trains, velocity ratios, paths of mechanical movements and their application to velocity diagrams, quick-return mechanisms, and cams.

PROFESSOR ASHLEY.

044-3 MECHANISM

Curriculums: II, V — *Preparation: 044-2*
Second year, second semester — *Six hours per week*

A continuation of Mechanism 044-2, embracing a careful study of gear-tooth outlines.

PROFESSOR ASHLEY.

General Engineering

050-1 ENGINEERING CONFERENCE

All curriculums — *Preparation: — —*
Second, third and fourth years: both semesters — *Two hours per week*

The connecting link between the industry and the class room. The second, third and fourth-year men of each curriculum meet in four separate groups for nine of the ten meetings, during each period. Each student, in turn, gives a thirty to forty-five minute talk on some particular topic of engineering interest. This talk then becomes the subject of

discussion by the whole class, and the problem is considered in as much detail as seems best to the instructor.

For the tenth meeting of each period all courses meet together in Bates Hall and hear some speaker on a technical subject of live interest to all engineering students.

The marks for the reports written each period while at work, and the marks for the individual talk, are averaged in due proportion to find the grade due the student.

PROFESSORS NIGHTINGALE, ALVORD, DURKEE AND ZELLER.
MR. PERKINS.

052-1 THESIS

All curriculums — *Preparation: Technical subjects*
Fourth year, both semesters — *One hour per week*

Each student who is a candidate for graduation must, during his senior year, prepare and present a thesis, the satisfactory completion of which is a pre-requisite for receiving a degree from the School of Engineering. By "thesis" is meant an essay involving the statement, analysis, and solution of some problem in pure or applied science. Its purpose is to demonstrate a satisfactory degree of initiative and a power of original thought and work on the part of each candidate for an engineering degree.

The subject of the thesis is to be decided in conference between the candidate and that faculty member of the professional department to whom he is assigned for supervision in thesis work, final approval, however, resting with the head of the department. This subject may be one of structural design, research, testing, study of a commercial process, etc., but in no case would a mere resumé of prior knowledge and a discussion of the present state of the matter be acceptable. This, it is true, must normally be made, but in addition thereto there must be a certain amount of work planned and executed, aimed toward the extension of the present field of information as regards the subject chosen.

In many cases the student presents an individual thesis. However, in nearly equal number, acceptable subjects will be found necessitating the co-operation of at least two men, either of the same or sometimes of different professional

departments. In such cases, each man is primarily responsible for a certain part of the work, while also making himself wholly familiar with the entire problem; and the completed thesis must show clear evidence of the evenly-balanced co-operation and labor of the men concerned.

The completed thesis will be examined for acceptance or rejection from the technical viewpoint by the professional departments interested, and then forwarded to the Dean's office, the final approval of the thesis resting with the Dean.

Upon acceptance, the thesis becomes the property of the School of Engineering, together with all apparatus and material used in connection therewith, except that hired or borrowed, or which was already the personal property of the candidate. It is not to be printed, published, nor in any other way made public except in such manner as the professional department and the Dean shall jointly approve.

For all further information, the candidate for the degree is referred to the "Directions for Theses," which he must obtain from his professional department at the beginning of his senior year.

The arrangement of hours shown in the curriculums may be varied to suit the requirements of each department.

Physical Education

060-1 PHYSICAL TRAINING

All curriculums — *Preparation:* — —
First year, both semesters — *Two hours per week*

All first-year students are required to take Physical Training. Health, strength, and vitality do not come by chance, but by obedience to natural laws. It is very essential for the students to acquire good habits of life. The work in the gymnasium is of the body building type, with plenty of competition. Regular classes in calisthenics are held under an able physical instructor.

Students who are members of the Varsity Squads in any of the major sports may be excused from Physical Training upon petition to the Faculty, providing the petition is supported by the certification of the Athletic Coach and Physical Director. Upon petition of a student to be excused from Physical

Training, owing to physical disability, favorable action will be taken by the Faculty only when said petition is accompanied by a physician's certificate, verifying the disability.

MR. SINNETT.

DEPARTMENT OF CIVIL ENGINEERING

11-1 SURVEYING

Curriculum: I — *Preparation: ——*
First year, first semester — *Two hours per week*

Lectures, recitations, and problem work in which the following subjects are considered: the chain, tape, compass, transit, and level, methods of making and computing both closed and random traverses, location of buildings and points.

MR. INGALLS.

11-2 SURVEYING

Curriculum: I — *Preparation: 11-1*
First year, second semester — *Two hours per week*

Surveying for deeds, city surveying, U. S. system of public land surveying, differential and profile leveling, theory and use of contour maps, stadia methods and various special problems.

MR. INGALLS.

11-3 SURVEYING: FIELD-WORK AND PLOTTING

Curriculum: I — *Preparation 11-1 taken concurrently*
First year, first semester — *Five hours per week*

Two afternoons per week are devoted to preliminary practise with the standard surveying instruments. The work depends upon, and is closely allied to, the theoretical work in 11-1. The student first practises taping and chaining, then learns to use the compass for reading magnetic bearings. Next he runs a closed compass and tape traverse. Then follows practice with the transit level, and tape, concluding with a large transit and tape closed traverse. This traverse is balanced, plotted, and completed as a map. This includes the location and plotting of streets, buildings, etc., included within the traverse. Work is done on contour maps, with

problems; differential and profile leveling; stadia methods; and various special problems such as layout of line and grade for a sewer or a building. MR. INGALLS AND ASSISTANTS.

11-4 SURVEYING, FIELD-WORK AND PLOTTING

Curriculum: I — *Preparation: 11-2 taken concurrently*
First year, second semester — *Five hours per week*

A continuation of Surveying 11-3.

MR. INGALLS AND ASSISTANTS.

11-5 SURVEYING

Curriculum: I — *Preparation: 11-3, 11-4*
Second year, first semester — *Two hours per week*

The student is taught the theory of plane and geodetic triangulation, the theory of the sextant, the theory of plane table topographical surveying, the adjustments of instruments, and the methods of stellar observation for the determination of azimuth. Surveying problems in review of the elementary work are assigned to make sure that the student has a comprehensive and accurate knowledge of the art.

MR. INGALLS.

11-6 SURVEYING, FIELD AND PLOTTING

Curriculum: I — *Preparation: 11-5 taken concurrently*
Second year, first semester — *Five hours per week*

The work follows closely and is dependent upon the theoretical work of 11-5. Actual practise is given in triangulation, work with the sextant, plane table, field adjustment of instruments and in making an observation on polaris for latitude and azimuth.

MR. INGALLS.

11-7 SURVEYING

Curriculum: V — *Preparation: — —*
First year, first semester — *Three hours per week*

Lectures, recitations, and problems designed to give the students in Administrative Engineering instruction in the essential principles of surveying. A part of the time will be devoted to the illustration of these principles with the aid of the transit and level.

PROFESSOR ALVORD.

11-8 TOPOGRAPHICAL DRAWING

Curriculum: I, V1 — *Preparation: 11-3, 11-4*
Third year, first semester — *Three hours per week*

The course is devoted to the study of the conventional signs used in topographical drawing. Proficiency is sought in the use of the lettering pen, contour pen, ink and water color in map work. The various uses of a contour map are illustrated by problems in drawing.

PROFESSOR GEE.

12-1 RAILROAD SURVEYING

Curriculum: I — *Preparation: 11-5, 11-6*
Second year, second semester — *Three hours per week*

The course covers the principles and application of simple, compound, reversed, parabolic, and transition curves to railroad and highway location, also the principles of reconnaissance, preliminary and location survey for a railroad.

MR. INGALLS.

12-2 RAILROAD SURVEYING, FIELD WORK AND PLOTTING

Curriculum: I — *Preparation: 12-1 taken concurrently*
Second year, second semester — *Five hours per week*

The work follows closely the theory of 12-1. It includes the layout in the field of various railroad curves; the reconnaissance, preliminary and location survey of a line of railroad. Drafting room problems on location of railroads and highways from existing contour maps are given.

MR. INGALLS AND ASSISTANTS.

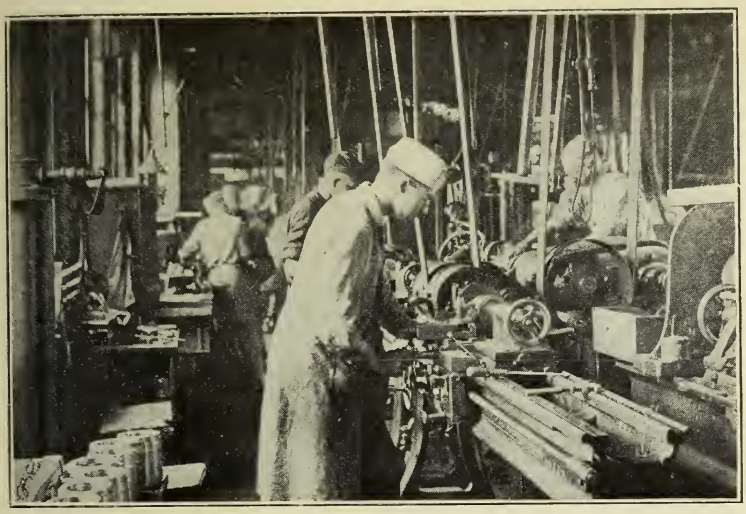
12-3 RAILROAD ENGINEERING

Curriculum: I — *Preparation: 12-1, 12-2*
Third year, first semester — *Two hours per week*

The work is a continuation of 12-1. Methods of computing excavation and embankment, including the use of tables and diagrams, are studied in detail. Further study is devoted to the effect of haul, and the use of the mass diagram in the determination of the final location. The economics of railroad location are considered.

MR. INGALLS.

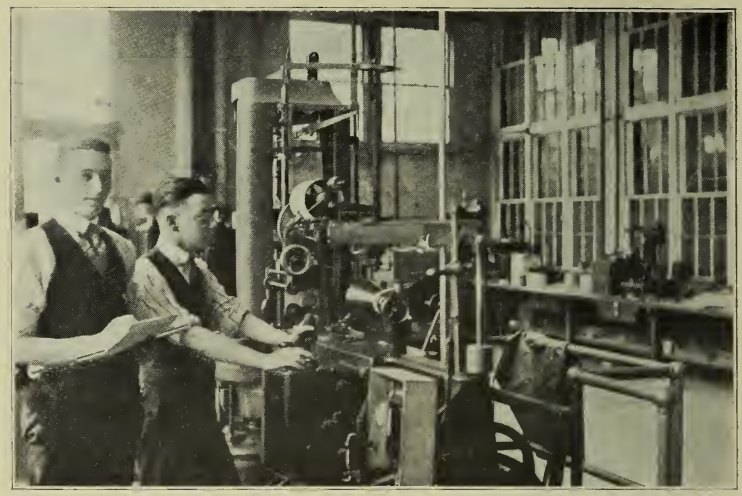
Mechanical Engineering Students



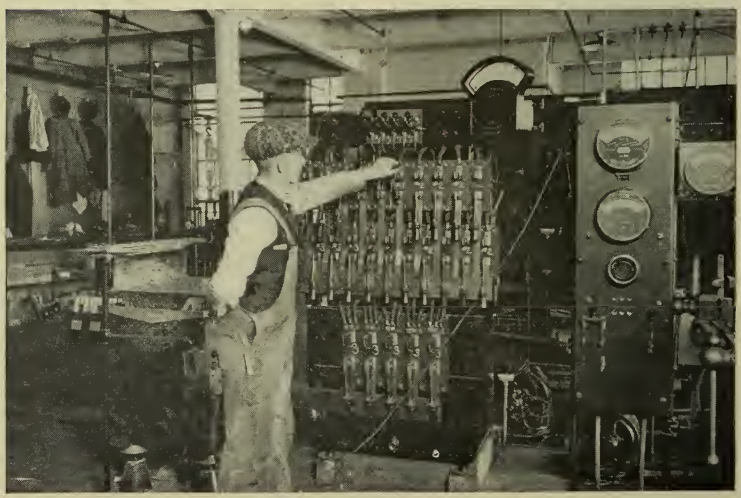
Finishing Castings
Blanchard Machine Company, Cambridge

Assembling Machines
United Shoe Machinery Corporation, Beverly

Electrical Engineering Students



Testing Materials
General Electric Company, Lynn



Testing a 10,000 Ampere Storage Battery Control Panel
Condit Electrical Manufacturing Company

12-4 RAILROAD ENGINEERING, FIELD WORK AND PLOTTING

Curriculum: I — *Preparation: 12-3 taken concurrently*
Third year, first semester — *Five hours per week*

Field work in connection with 12-3. The final location and profile of the railroad line is plotted, including the vertical, horizontal, and transition curves. A mass diagram is drawn for the earthwork, and a final computation of cost is made. The line is cross-sectioned and slope-staked.

MR. INGALLS AND ASSISTANTS.

13-1 HYDRAULICS

Curriculums: I, II, V_1 — *Preparation: — —*
Third year, first semester — *Three hours per week*

A study of the principles of both hydrostatics and hydrodynamics. The subjects considered are: the pressures on submerged areas together with their points of application; the laws governing the flow of fluids through orifices, short tubes, nozzles, weirs, pipe lines and open channels; and the dynamic action of water flowing over both stationary and moving curved surfaces. A short study of stream flow measurements is also included.

PROFESSOR DURKEE.

13-2 HYDRAULIC MOTORS

*Curriculums: II, III** — *Preparation: 13-1 or 13-3*
Third year, second semester — *Two hours per week*

Principles underlying the design of hydraulic turbines and motors. A complete study is also made of stream flow, storage and other details relating to hydraulic installations.

PROFESSOR ZELLER.

13-3 HYDRAULICS

Curriculums: III, IV, V_2† — *Preparation: — —*
Third year, second semester — *Two hours per week*

Similar to Hydraulics 13-1, but adapted to the special needs of the students in these curriculums.

PROFESSOR DURKEE.

*Fourth year, first semester.
†Fourth year, second semester.

14-1 THEORY OF STRUCTURES

Curriculum: I, V1 — *Preparation: 21-3*
Third year, second semester — *Three hours per week*

Class and drawing-room work in studying the loads, reactions, shears, and moments acting upon structures of various kinds, such as roofs and bridges. A thorough study is also made of the various functions of the influence line; the methods used to determine the position of moving loads to produce maximum shears and moments on bridges; and the design of beams.

PROFESSOR ALVORD.

14-2 STRUCTURAL DRAWING

Curriculum: I, V1 — *Preparation: 21-3, 041-1*
Third year, second semester — *Three hours per week*

Drawing of standard sections of structural steel shapes and connections, and the preparation of drawings representing elementary structural details. The course is designed to familiarize the student with the designing and drawing of riveted connections, and the dimensioning and detailing of structural parts.

PROFESSOR ALVORD.

14-3 ENGINEERING STRUCTURES

Curriculum: I, V1 — *Preparation: 14-1, 14-2*
Fourth year, both semesters — *Six hours per week*

The computation and design of structures of wood, steel, and masonry by analytical and graphical methods. The subjects considered are: plate girders, roof and bridge trusses of various types, such as simple trusses, bridge trusses with secondary web systems—including Baltimore and Pettit trusses—and trusses with multiple web systems, lateral and portal bracing, transverse bents, viaduct towers, and cantilever bridges. A study is also made of the design of columns, tension members, pin and riveted truss joints, trestles of wood and steel, masonry dams, retaining walls, and arches. The student is also given training in the use of the standard handbooks in structural work. The object is to train the student thoroughly in the application of mechanics to the design of structure.

PROFESSOR ALVORD.

14-4 STRUCTURAL DESIGN

Curriculum: I, V_1 — *Preparation: 14-3, taken concurrently*

Fourth year, both semesters — *Six hours per week*

Designing and detailing of structures, using the theory learned in Engineering Structures 14-3. Complete working drawings are ordinarily made of a single track plate girder railroad bridge, a riveted truss highway bridge, and a small concrete arch.

PROFESSOR ALVORD.

15-1 CONCRETE

Curriculum: I, II — *Preparation: 21-3*

Fourth year, both semesters — *Two hours per week*

Concrete as a material of construction is studied in detail, and the principles of reinforced concrete design are learned. Computations and designs are made of flat slabs, T beams, columns, footings, retaining walls, and arches.

PROFESSOR ALVORD.

15-2 CONCRETE DESIGN

Curriculums: I, II — *Preparation: 15-1, taken concurrently*

Fourth year, both semesters — *Three hours per week*

Detailing and making of complete working drawings of the concrete structures designed in Concrete 15-1.

PROFESSOR ALVORD.

16-1 MATERIALS

Curriculums: I, II, V_2 — *Preparation: 21-3*

Fourth year, first semester — *Two hours per week*

A detailed study is made of the methods of manufacturing, properties, and uses of materials used in engineering work; such as iron and steel, lime, cement, concrete, brick, wood and stone. Methods of testing and strength of various materials used by the engineer are also taken up. Each student is required to prepare, and present to the class, a paper on some subject of especial importance, which is assigned by the instructor.

MR. STEARNS.

16-2 TESTING MATERIALS LABORATORY

Curriculum: I, V1 — *Preparation: 12-3*
Third year, second semester — *Two hours per week*

The work is done by the students and includes tests to determine the elongation, reduction of areas, modulus of elasticity, yield point, ultimate compressive strength of metals, such as steel, cast iron, copper and brass; tensile and compressive tests on timber and concrete; tests to determine the deflection, modulus of elasticity, elastic limit, and ultimate transverse strength of steel and wooden beams, subject to transverse loads. Tests are also made on cement mortars to determine the strength of cubes and briquettes at different ages.

PROFESSOR ALVORD.

16-3 FOUNDATIONS

Curriculum: I — *Preparation: 14-1, 16-1, taken concurrently*
Fourth year, first semester — *Two hours per week*

The subjects treated are pile formations—including those of timber and concrete—sheet piles, coffer-dams, box and open caissons, pneumatic caissons, pier foundations in open wells, bridge piers, and abutments.

PROFESSOR GEE.

16-4 GEOLOGY

Curriculum: I, V1 — *Preparation: — —*
Third year, first semester — *Two hours per week*

Earth movements and the various terrestrial applications of solar energy. The more important geological processes, erosion, sedimentation, deformation, and eruption are taken up and discussed. The latter part of the course is devoted to lectures on the broader structural features of the earth's crust and the application of the principles of structural geology to practical engineering problems.

PROFESSOR PUGSLEY.

17-1 HIGHWAY ENGINEERING

Curriculum: I — *Preparation: 11-2*
Fourth year, second semester — *Two hours per week*

The location, construction, and maintenance of roads, street design, and street drainage; sidewalks; pavement foundations; and the construction, cost and maintenance

of the various kinds of roads and pavements, including asphalt, brick, stone-block, wood-block, macadam (both water bound and bituminous), bituminous concrete, hydraulic cement concrete, gravel, and earth. Special consideration is given to the modern concrete road.

PROFESSOR GEE.

DEPARTMENT OF MECHANICAL ENGINEERING

21-1 APPLIED MECHANICS (STATICS)

All curriculums — *Preparation: 022-1, 031-1*
Second year, first semester — *Three hours per week*

The topics covered are: forces in equilibrium, parallel forces, stresses in frames and forces in three dimensions. The student is required to solve a large number of problems, and to pass examinations at frequent intervals. It is felt that the student should retain a considerable body of facts about this subject in his mind after graduation; therefore a thorough groundwork of theory is covered.

PROFESSOR BENEDICT,
MR. STEARNS.

21-2 APPLIED MECHANICS (KINETICS)

All curriculums — *Preparation: 21-1*
Second year, second semester — *Three hours per week*

A continuation of Applied Mechanics 21-1 covering center of gravity, moment of inertia, radius of gyration, kinematics of harmonic motion and pendulums, and kinetics of translation and rotation.

PROFESSOR BENEDICT,
MR. STEARNS.

21-3 STRENGTH OF MATERIALS

Curriculums: I, II, V — *Preparation: 21-2*
Third year, both semesters — *Three hours per week*

The topics covered are: the theory and experimental basis of tension, compression, shear, resilience, modulus of elasticity, bending stresses, the design of beams, moment and shear diagrams, use of tables of standard steel shapes, longitudinal shear and deflection in beams, combined stresses, beams with three supports, columns, the strength of shafts and springs, and principal stresses.

PROFESSOR BENEDICT.

21-4 STRENGTH OF MATERIALS

Curriculums: III, IV — *Preparation: 21-1*
Third year, first semester — *Three hours per week*

Similar to Strength of Materials 21-3, but more limited in time. The topics omitted are columns, principal stresses, and longitudinal shear and deflection in beams.

PROFESSOR BENEDICT.

22-1 GRAPHICAL ANALYSIS

Curriculum: II, V_2 — *Preparation: 042-4, 044-3, 21-2*
Third year, first semester — *Six hours per week*

Many problems which may readily be solved by graphical methods are included here. Valve gear problems are solved by the use of the various diagrams. The kinematical features of various machines are studied by means of velocity and acceleration diagrams.

PROFESSOR FERRETTI.

22-2 MACHINE DESIGN

Curriculum: II, V_2 — *Preparation: 21-3, taken concurrently*
Third year, second semester — *Six hours per week*

An application of the principles studied in Applied Mechanics and Mechanism to the design of machine parts. The problem work of the course consists mainly in the design of a steam boiler as the stresses for such a design are known to a great degree of certainty, and the materials of construction are very reliable.

PROFESSOR FERRETTI.

22-3 MACHINE DESIGN

Curriculum: II, V_2 — *Preparation: 22-2*
Fourth year, both semesters — *Six hours per week*

Further practice is given the student in the application of theoretical principles previously studied, and at the same time he becomes familiar with the many practical details which must be considered in design work. The problems taken up in the early part of the course are of a static nature, while the later problems involve dynamical stresses. The prob-

lems vary from year to year, but the following are typical of the designs taken up: hydraulic press, arbor press, hydraulic flanging clamp, crane, air compressor, punch and shear, stone-crusher, etc.

In each design, the constructive details are carefully considered, with special attention to methods of manufacture, provision for wear, lubrication, etc. The work is based on rational rather than empirical methods, the student being required to make all calculations for determining the sizes of the various parts and all necessary working drawings.

PROFESSOR FERRETTI.

22-5 MECHANISMS OF MACHINES

Curriculum: II — *Preparation: 044-3*
Third year, second semester — *Three hours per week*

Designed to supplement the work in pure mechanism as given in course 044-3, by a consideration of the application of mechanisms to actual machines, thereby furnishing the student with a series of practical mechanisms to accomplish definite purposes, and increasing his ability to analyze the action of other machines.

PROFESSOR FERRETTI.

23-1 HEAT ENGINEERING

Curriculums: II, III, V_2 — *Preparation: 023-2, 033-1*
Third year, both semesters — *Three hours per week*

The fundamental principles underlying the subject of thermodynamics. A study is made of the following topics: the properties of perfect gases, saturated and super-heated vapors, air and steam cycles, and the flow of fluids through nozzles, and pipe-lines, and the calculations of an air compressor. In the second half-year the principles of thermodynamics are applied to the various parts of the modern steam power plant. This includes a study of boilers, fuels, and combustion, flue gas analysis, feed-water heaters, chimneys, steam engines, condensers, cooling towers, gas power, steam turbines, and also the methods of testing power plant equipment.

PROFESSOR FERRETTI.

23-2 ENGINEERING LABORATORY

Curriculum: III — *Preparation: 23-1*
Fourth year, first semester — *Two hours per week*

A short series of tests and exercises upon the various appliances in use in modern power plants. The students here apply the knowledge they have gained in the class room, making a complete report of the test, including methods of testing and computations.

PROFESSORS FERRETTI AND ZELLER.

23-3 HEAT ENGINEERING

Curriculums: I, IV — *Preparation: 023-2, 033-1*
Third year, second semester — *Three hours per week*

The subject matter of heat engineering is presented to the students of civil and chemical engineering to meet their special needs.

PROFESSOR FERRETTI.

23-4 STEAM TURBINES

Curriculum: II — *Preparation: 23-1*
Third year, summer term — *Five hours per week*

A study of the principles of the flow of fluids, kinetic effects, and thermodynamics with the steam turbine used as a current example. The fundamental differences in the principle of the different types of turbines; the field of application of the steam turbine; and the influence of high vacuum together with the condensing equipment developed for turbine work, are all given careful attention.

PROFESSOR ZELLER.

23-5 HEAT ENGINEERING

Curriculum: II — *Preparation: 23-1*
Fourth year, first semester — *Three hours per week*

A study of the various systems of refrigeration, such as the ammonia absorption and compression machines, constitutes the major portion of the course. A brief study is also made of the principles of heating and ventilation, and of Hirn's analysis of the losses in a steam engine.

PROFESSOR FERRETTI.

23-6 ENGINEERING LABORATORY

Curriculum: II — *Preparation: 23-1*
Third year, summer term — *Fifteen hours per week*

Similar to Engineering Laboratory 23-2, but covering the ground more completely than was possible with the limited time available in that course.

PROFESSORS FERRETTI AND ZELLER.

24-1 PRODUCTION ENGINEERING

Curriculums: II, V — *Preparation: — —*
First year, first semester — *Two hours per week*

A descriptive course intended to acquaint the student with the organization, methods, and equipment used in industrial plants engaged in quantity production. For purposes of discussion the plant is divided into its various units: such as general offices, drafting-room, pattern-shop, foundry, machine-shop, erecting shop, testing-room, etc. The mechanical equipment, filing systems, cost-keeping systems, "follow-up" cards, etc., are described, and representative examples are shown.

PROFESSOR ZELLER.

24-2 PRODUCTION ENGINEERING

Curriculums: II, V — *Preparation: 24-1*
First year, second semester — *Two hours per week*

A continuation of Production Engineering 24-1.

PROFESSOR ZELLER.

24-3 POWER PLANT EQUIPMENT

Curriculum: II — *Preparation: 23-1 taken concurrently*
Third year, first semester — *Two hours per week*

Largely a description of the many appliances used in modern power plants. A discussion of boilers and boiler accessories, ash and coal handling systems, the various types of engines—gas engines and turbines—with their valve gears and governing devices, condensers, feed-water heaters, pumps, etc.

PROFESSOR ZELLER.

24-4 POWER PLANT ENGINEERING

Curriculum: II, V_2 — *Preparation: 23-1*
Fourth year, second semester — *Three hours per week*

Topics and problems chosen largely from engineering practice selected to convey to the engineering students a firm grasp of fundamental principles and engineering methods of attacking and analyzing problems in power plant, not only from the point of view of scientific theory, but also with due consideration of the limitations imposed by practice and by costs. Efficiency and operation costs of different types of plants such as steam, hydo-electric and Diesel engines are also carefully studied to determine the type of plant best suited for the conditions and location involved.

PROFESSOR ZELLER.

24-6 STANDARD ENGINEERING PRODUCTS AND PROCESSES

Curriculums: II, III — *Preparation: 16-1*
Fourth year, second semester — *Two hours per week*

Intended to familiarize the student with the commercial names and sizes of engineering products: such as, bar and plate stock, shafting, tubing, pipes, valves, bearings and hangers, belts, pulleys, etc. A discussion of such manufacturing processes as extrusion, broaching, press work, electric and oxy-acetylene welding, cold and hot rolling and drawing, etc., is included.

PROFESSOR ZELLER.

25-1 INDUSTRIAL PLANTS

Curriculum: II, V_2 — *Preparation: 21-3, 24-2*
Fourth year, first semester — *Four hours per week*
second semester — *Six hours per week*

The principles involved in the erection, installation, and management of an industrial plant. A description of the different types of structures, with consideration of such details as foundations, walls, columns, floors, windows, etc., is followed by a discussion of the installation of the power plant and machinery. Principles of illumination, fire-prevention, heating and ventilation, routing of materials, and the organization and management of a plant are taken up. Design problems are given in connection with the course.

PROFESSOR ZELLER.

DEPARTMENT OF ELECTRICAL ENGINEERING

30-1 ELEMENTS OF ELECTRICITY

Curriculums: I, II, IV, V — *Preparation: 022-1, 031-1*
Second year, first semester — *Three hours per week*

The foundation for subsequent electrical engineering work for students of Civil, Mechanical, and Chemical Engineering. Emphasis is laid on the fundamental principles, and the subject is developed by elaborating these principles through numerical applications. The topics discussed are, briefly: magnets and magnetism, electrical resistance and Ohm's law, electric work and power, series and parallel circuits, electromagnetism, electromagnetic induction, magnetic properties of iron, electrolysis and batteries, alternating currents and voltages, inductance, capacitance, and circuits containing resistance, inductance, and capacitance.

MR. PORTER.

30-3 APPLIED ELECTRICITY

Curriculums: I, II, IV, V — *Preparation: 30-1*
Second year, second semester — *Three hours per week*

The object is to fit the student to handle intelligently electrical problems that are likely to come up in connection with his chosen field. The course varies somewhat in content, depending upon the particular branch of engineering which most of the students in the class are studying. In any case, the first period is devoted to a consideration of various direct-current machines and appliances; their characteristics and applications. In the second period alternating-current apparatus is treated in a similar manner.

MR. PORTER.

30-4 APPLIED ELECTRICITY LABORATORY

Curriculums: I, II, IV, V — *Preparation: 30-3*
Second year, summer term — *Twenty-five hours per week*

The characteristics and operation of direct and alternating current machinery, discussed in Course 30-3. The experiments deal with the following: resistance measurement, speed control direct-current motors; voltage control of generators; voltage regulation of direct-current generators; speed regulation of direct-current motors; brake tests of various types of direct and alternating-current motors; measurement of losses and the calculating of the efficiency

of motors and generators; alternating current circuits containing resistance, inductance, and capacitance; determination of the characteristics of transformers; various polyphase connections; regulation of alternators; synchronous motor, rotary converter, and induction motor characteristics. A written report is required on each experiment, and especial care is exercised that such reports be correct in manner and in form.

MR. PORTER.

31-1 ELEMENTS OF ELECTRICAL ENGINEERING

Curriculum: III — *Preparation: — —*
First year, first semester — *Two hours per week*

A descriptive discussion of the fundamental principles of electrical practice, combined with an outline of their application in the art. The principal aim is to familiarize the student as soon as possible with those matters with which it is important he should be acquainted, in order that he may from the beginning obtain the most possible from his Engineering Practice.

PROFESSOR SMITH.

32-1 ELECTRICAL ENGINEERING I

Curriculum: III — *Preparation: 31-1, 40-1*
First year, second semester — *Four hours per week*

A study in detail of the electric current, electromotive force and resistance, electrical work and power, electrical circuits, Kirchoff's laws, primary and secondary batteries, magnetism, electromagnetism, electromagnetic induction, self and mutual inductance, electrostatics, energy stored in the electromagnetic and electrostatic field. The practical units of measurement are discussed, as the several quantities to which they apply are successively reached. The work includes demonstration and simple experimentation arranged to enforce the principles discussed theoretically.

MR. PORTER.

32-3 ELECTRICAL ENGINEERING II

Curriculum: III — *Preparation: 022-1, 32-1*
Second year, first semester — *Three hours per week*
second semester — *Four hours per week*

A careful, though more or less descriptive, discussion of the dynamo in general operating both as generator and motor, armature windings, armature reactions and their compen-

sation, commutation, etc., followed by a thorough study of the direct-current machine from the point of design, during the first semester; and, during the second semester, a consideration of the methods of testing for efficiency and performance followed by some examination of the applications of the machines studied, as, parallel operation, three-wire systems, boosters and balancers, special motor applications and control methods.

Much emphasis is placed upon the working out of practical problems, a special weekly period being allowed during the second semester for this purpose and about one hundred problems worked in the class room.

PROFESSOR SMITH.

32-4 ELECTRICAL ENGINEERING II, LABORATORY

Curriculum: III — *Preparation: 32-3, taken concurrently*

Second year, both semesters — *Six hours per week*

A carefully-selected series of experiments intended to exemplify qualitatively, and in the clearest manner, the principles developed in the parallel lectures, 32-3. It includes a series of about twenty experiments, of which the following may be mentioned as illustrative of the type of work:

The starting of a shunt motor, and starting devices.

The speed, field, and voltage relations in a separately excited machine.

The heat test of a generator.

The characteristic curves of generators.

The parallel operation of shunt and compound generators.

The three-wire balancer set.

The speed and torque curves of the series motor.

Satisfactory completion of fifteen experiments is the minimum acceptable amount of work.

Since the purpose of the course is in part to develop correct methods of work, it is intended that the whole of the preparatory work, as well as the working up of the data obtained, shall be done in the laboratory under supervision of the instructor, so far as necessary.

MR. PORTER.

32-6 ELECTRICAL ENGINEERING III, LABORATORY

Curriculum: III — *Preparation: 32-4,* and *32-7* and *33-1, taken concurrently*

Third year, both semesters — *Six hours per week*

A series of experiments involving the testing of machines; together with experiments intended to elucidate practically the principles developed in the parallel course on alternating currents, 32-7, and also to train the student in the use of the special types of instruments which he will later use in the laboratory work upon alternating current machinery.

Illustrative experiments are:

Stray power tests, Prony brake tests, retardation tests, pumping back tests, regulation tests, heat runs, analysis of losses, etc.

Study of A-C series and parallel circuits, resonant conditions, effect of frequency change on circuit constants, parallel operation of A-C machines, synchronizing and changing load, power factor measurements, power measurement in polyphase circuits, etc.

As the course progresses, the student is thrown more and more upon his own resources; a desired result is stated to him, and he is left to plan out his own methods, settle upon the apparatus needed, solve his precision requirements, calibrate the instruments, if necessary, and finally turn in a detailed report covering all phases of the work from its inception.

PROFESSOR SMITH.

32-7 ELECTRICAL ENGINEERING III

Curriculum: III — *Preparation: 022-1, 32-3*

Third year, both semesters — *Three hours per week*

Lectures, recitations and problem work upon the electromagnetic and electro-static fields and the theory of alternating currents. The course covers the consideration of the "steady state," both when we have a pure sine wave and when we have a complex wave. Transients are not considered. The subject is developed principally by the aid of vector algebra, and the student is urged to use the methods of complex quantity to the fullest extent.

Application of the principles developed to all possible combinations of resistance, inductive and condensive reactances

in both single and polyphase circuits is given by the working of about two hundred problems involving both analytical and graphical methods.

32-8 ELECTRICAL ENGINEERING IV, LABORATORY

Curriculum: III — *Preparation: 32-9, taken concurrently*

Fourth year, both semesters — *Six hours per week*

Laboratory course to accompany Course 32-9 in alternating-current machinery. The work includes tests on the heating, efficiency, and determination of the characteristics of the various types of alternating-current machinery, such as transformers, generators, and motors. A detailed preliminary study is made of each assigned experiment, involving the theoretical principles, the method of procedure to obtain the required results, and the way in which the results should be worked up. This is embodied in a preliminary report. The student then does the necessary laboratory work to obtain the required data; and finally works up the whole into a detailed final report. The assistance given by the instructor is reduced to a minimum, the initiative and resourcefulness of the student being depended on to the greatest extent.

PROFESSOR DURKEE.

32-9 ELECTRICAL ENGINEERING IV

Curriculum: III — *Preparation: 023-2, 32-7*

Fourth year, both semesters — *Four hours per week*

A careful, thorough, and detailed discussion of the construction, theory, operating characteristics, and testing of the various types of alternating current machinery. The first half of the course is equally divided between the transformer and the synchronous generator. In the second half of the course synchronous motors, parallel operation of alternators, synchronous converters, polyphase induction motors, the induction generator, single phase induction motors, and commutating alternating-current motors are taken up. One two-hour period a week is spent in the solution of numerical problems.

PROFESSOR DURKEE.

33-1 ELECTRICAL MEASUREMENTS

Curriculum: III — *Preparation: 32-3*
Third year, both semesters — *Two hours per week*

A brief discussion of measurement in general and electrical measurements in particular, in which a review of the electrical units and their definitions has a part. Resistance devices, galvanometers, ammeters, and voltmeters are next discussed, the treatment of other instruments being taken up later in connection with their uses. This is followed by a detailed discussion of the methods of measuring the various electrical quantities—resistance, resistivity, conductivity, current, electromotive force, capacitance, inductance, magnetic induction, permeability, hysteresis loss, energy, and power. The student is given a thorough discussion of the construction, theory of operation, method of use, sources of error, etc., of the types of measuring instruments used in commercial work and in the standardizing laboratory.

PROFESSOR DURKEE.

33-2 ELECTRICAL MEASUREMENTS LABORATORY

Curriculum: III — *Preparation: 33-1*
Third year, second semester — *Three hours per week*
summer term — *Twenty-five hours per week*

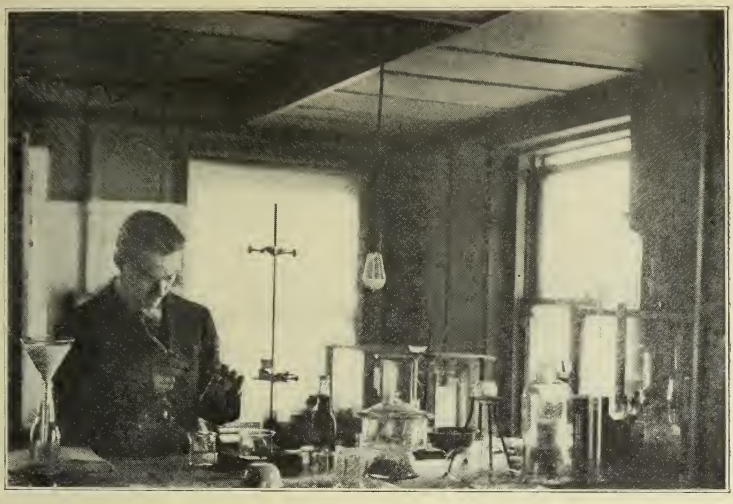
A series of experiments emphasizing the principles developed in Course 33-1. The student becomes familiar with the use of the standard apparatus in use in testing laboratories. Particular stress is laid on the correct use of the apparatus, and precision discussions are required throughout.

The experiments cover such matters as the measurement of resistance by various methods, resistivity, conductivity, electromotive force, current inductance, capacitance, magnetic induction, magnetizing force, hysteresis loss, etc. Work is given in calibrating ammeters, voltmeters and watt-hour meters, in cable testing, magnetic testing, wave form determination, and the use of special apparatus such as the Kelvin bridge, Carey Foster bridge, potentiometer, etc., and secondary laboratory standard instruments.

Thorough training in the principles of Precision of Measurements is also given, and applied to each experiment performed.

PROFESSOR DURKEE.

Chemical Engineering Students



Analyzing Food
A. B. Werby Laboratories

Testing Road Materials
Warren Brothers—Paving Materials

Students Engaged in Engineering Practice

Drafting
Designing Engineer's Office—B. & A. Railroad

Machine Designing
Kinney Manufacturing Company, Boston

34-1 ELECTRICAL ENGINEERING V

Curriculum: III — *Preparation: 13-2, taken concurrently; 32-7, 32-9, taken concurrently*

Fourth year, both semesters — *Four hours per week*

A detailed study of the central station, both steam-driven and hydro-electric, equally careful attention being given to the engineering and economic details, the influence of the various applicances upon the cost of power being kept constantly in view.

Following this comes a careful study of the high tension transmission line, the potentials used, spacing of conductors, line characteristics, losses, inductive effects upon neighboring circuits, quarterwave transmission, surges, etc.

After this is considered the sub-station and equipment, and then follows a full discussion of distribution systems and the utilization of electrical power, especial attention being given to railway operation, and the matter of outdoor and interior illumination. The course closes with a brief discussion of the public utility in its relations to the community served.

PROFESSOR SMITH.

35-1 ADVANCED ELECTRICITY

Curriculum: III — *Preparation: 32-7*

Fourth year, both semesters — *Two hours per week*

This course consists of two parts: first, the matter of electro-magnetic radiation, the propagation of waves in space and along wires, and a detailed discussion of the theory of transients intended to supplement the more practical consideration of transmission lines given in course 34-1.

The latter part of the course is given over to a full descriptive discussion of modern electrical theory. Beginning with the state of electrical science in the time of Franklin, the development of the science is traced through the work of Faraday, Maxwell, Hertz and Kelvin on the one hand; of Weber, Crookes, J. J. Thomson, Millikan, and others on the other. The subjects of metallic, electrolytic, and gaseous conduction are discussed, together with ionization, the theories of electromagnetic mass, and the electrical constitution of matter.

PROFESSOR SMITH.

DEPARTMENT OF CHEMICAL ENGINEERING

40-1 INORGANIC CHEMISTRY

Curriculums: I, II, III* — *Preparation: — —*
First year, first semester — *Four hours per week*

Inorganic chemistry designed to meet the needs of students in non-chemical courses. A brief discussion of the general principles of chemistry as applied to engineering, with the idea of illustrating the applications of chemistry to special lines of engineering work.

PROFESSOR STRAHAN.
MR. BAKER.

41-1 INORGANIC CHEMISTRY

Curriculum: IV — *Preparation: — —*
First year, both semesters — *Four hours per week*

The fundamental principles of the science are taught by means of experimental lectures. Topics of a broad general character are taken up in the first part of the subject, in connection with the descriptive chemistry of the non-metallic elements, followed later by more specialized work in connection with the elements. Recitations will include a short written test on the two lectures of the week. Special attention is given to chemical calculations based on practical application.

PROFESSOR STRAHAN.

41-2 INORGANIC CHEMISTRY LABORATORY

Curriculum: IV — *Preparation: 41-1 taken concurrently*
First year, both semesters — *Five hours per week*

The object is to cultivate scientific attitude and habit of thought on the part of the student, and to increase his power of acquiring knowledge, whether it be from book, lecture, or from experiment. The experiments are planned to illustrate the topics which have been discussed in the lecture room. Careful manipulations, thoroughness in observation, accuracy in arriving at conclusions, are required of each student. In this, as in all subsequent laboratory work, neat and satisfactory notes will be considered an essential part of the work.

PROFESSOR STRAHAN.
MR. GREEN.

*Third year, second semester.

42-1 QUALITATIVE ANALYSIS

Curriculum: IV — *Preparation: 41-1, 41-2*
First year, summer term — *Ten hours per week*

The course is designed not merely to consider the procedures used in the detection of the common elements, but to deal in a much broader way with the principles involved in chemical analysis and to broaden the student's knowledge of inorganic chemistry, especially the chemistry of the metallic elements. A great deal of time is devoted to the study of the principles of hydrolysis, solubility product, correct concentration, amphoteric substances, and the general laws of solutions. In the latter part of the course the analysis of unusual mixtures will be discussed with especial emphasis on the interpretation of analytical results.

MR. PERKINS.

42-2 QUALITATIVE ANALYSIS LABORATORY

Curriculum: IV — *Preparation: 42-1 taken concurrently*
First year, summer term — *Twenty-eight hours per week*

After a series of preliminary experiments illustrating principles and giving opportunity for practice in writing equations, the analysis of unknown substances is undertaken, beginning with solutions and simple salts, and later analyzing minerals, pigments, slags, alloys, and various commercial products, such as boiler compounds, cleaning powders, glass enamels, and similar inorganic substances.

MR. PERKINS.

43-1 QUANTITATIVE ANALYSIS

Curriculum: IV — *Preparation: 42-1, 42-2*
Second year, first semester — *Two hours per week*

The general principles of quantitative analysis. Half of the time is devoted to the consideration of typical methods in gravimetric analysis, such as the determination of chloride in salt, the determination of sulphur in sulphur compounds, the complete analysis of brass, and other analyses involving general principles of procedure. The other half of the time is devoted to the methods of volumetric analysis as illustrated in the use of acid and alkali determinations, oxidation methods involving bichromate, permanganate and iodine, and the

methods of volumetric precipitation. Special attention is given to chemical calculations, and the solution of numerous analytical problems is one of the essential features of the course.

MR. PERKINS.

43-2 QUANTITATIVE ANALYSIS LABORATORY

Curriculum: IV — *Preparation: 43-1 taken simultaneously*

Second year, both semesters — *Five hours per week*

Analytical practice illustrating the methods discussed in Course 43-1. The calibration of burettes, the use and care of analytical balances, and a limited number of typical gravimetric and volumetric analyses are included in the course, in which great stress is laid on the accuracy, care, and integrity necessary for successful quantitative work.

MR. PERKINS.

44-1 TECHNICAL ANALYSIS

Curriculum: IV — *Preparation: 43-1, 43-2*

Third year, first semester — *Three hours per week*

A continuation of course 43-1, dealing more specifically with actual technical or commercial analytical problems. Especial emphasis is placed upon actual methods used in industrial operations. Complete reports covering the history, theory, and actual routine work will be asked for from each student, upon each problem undertaken. In general, the course will include the rapid methods of analysis of steel, the analysis of boiler waters, gases, fuels, oils, paints, varnishes, and similar substances.

MR. PERKINS.

44-2 TECHNICAL ANALYSIS LABORATORY

Curriculum: IV — *Preparation: 44-1, taken concurrently*

Third year, first semester — *Five hours per week*

Designed to illustrate by a limited number of analyses the technical methods of quantitative analysis. Problems will be assigned individually, depending on the student's future plans or his inclination, and will be selected from the fields of

steel analysis, gas and fuel analysis, including calorific testing, water analysis. Time is devoted to the study of pigments, soaps, or in general in the analysis of that class of materials in which the student is most interested.

MR. PERKINS.

44-3 TECHNICAL ANALYSIS

Curriculum: IV — *Preparation: 43-1, 44-1*
Third year, second semester — *Two hours per week*

This course is designed to cover in a brief manner the subject of metallography. The metallographic methods of investigation, including preparation of sample, etching, and microscopic examination will be discussed. A discussion of the more common non-ferrous alloys including bearing metals, type metals, solders, and brass will be undertaken by the interpretation of their temperature, composition diagrams and application to the Phase Rule. A portion of the time will also be devoted to the iron-carbon diagram, which will include the metallurgy and metallography of cast iron, malleable iron, carbon steels, and special steels.

MR. PERKINS.

45-1 ORGANIC CHEMISTRY

Curriculum: IV — *Preparation: 43-1 and 43-2, taken concurrently*
Third year, both semesters — *Three hours per week*

The underlying principles and theories of organic chemistry, the methods of preparation and characteristic reactions of carbon compounds. The important organic compounds will be considered in detail, because they serve as the most convenient examples for illustrating fundamental principles which elucidate the chemical character of substances which are of practical importance.

PROFESSOR STRAHAN.

45-2 ORGANIC CHEMISTRY LABORATORY

Curriculum: IV — *Preparation: 45-1, taken concurrently*
Third year, both semesters — *Five hours per week*

The operations, apparatus, and the laboratory technique involved in organic work, such as fractional distillation, extraction, crystallization, steam distillation, determinations

of melting points, boiling points, and the like. It deals also with general methods of preparation, such as etherification, saponification, sulphonation, diazotization, etc. The student will prepare a number of compounds—including nitro-benzene, aniline, ethers, phenols, and other typical organic substances.

PROFESSOR STRAHAN.

45-3 ORGANIC CHEMISTRY

Curriculum: IV — *Preparation: 45-1*

Fourth year, both semesters — *Two hours per week*

A review of Course 45-1 is given, but the subject is studied from a more mature point of view to furnish the student a more thorough survey of the fundamental principles which underlie the modern developments in this branch of chemistry.

Emphasis is placed on the effect of the nature of organic radicals on the properties of the compounds containing them, the effect of unsaturation, and the influence of structure and substituents on the activity of groups and the laws of substitution.

Industrially important compounds are treated more at length than those of a more purely scientific use and of interest to the advanced students only.

During the latter part of the course outside reading will be assigned in the scientific journals, followed by reports and discussions.

PROFESSOR STRAHAN.

45-4 ORGANIC CHEMISTRY LABORATORY

Curriculum: IV — *Preparation: 45-3 taken concurrently*

Fourth year, both semesters — *Five hours per week*

Preparations and reactions of the typical organic substances, including the methods of separation and identification of simple mixtures. The instruction also includes a study of the qualitative tests for the important groups occurring in organic compounds, together with the other physical data which would give valuable information as to the nature of the compound under examination.

The student is given several unknown pure compounds and mixtures to analyze which trains him to use his head as well as the information supplied in his text-books.

PROFESSOR STRAHAN.

46-2 CHEMICAL ENGINEERING

Curriculum: IV — *Preparation: — —*
Third year, second semester — *Two hours per week*

The study of basic principles such as the Law of Conservation of Elements, the Law of Conservation of Energy, and the Stoichiometrical Relationships of Solids and Gases. It is desired by the correlation of theoretical principles in the form of industrial plant problems to enlarge the viewpoint of the student and prepare him for Course 46-3.

MR. BAKER.

46-3 CHEMICAL ENGINEERING

Curriculum: IV — *Preparation: 46-2*
Fourth year, both semesters — *Three hours per week*

A continuation of the study of the principles underlying the mechanical operations involved in chemical industries, together with a study of the apparatus used to perform these operations. The subjects of crushing and grinding, separation, flow of heat, flow of fluids, evaporation, distillation, and drying, are considered in detail, accompanied by the solution of typical problems of a chemical engineering nature.

MR. BAKER.

47-1 INDUSTRIAL CHEMISTRY

Curriculum: IV — *Preparation: 44-1, 45-2*
Fourth year, first semester — *Three hours per week*
second semester — *Two hours per week*

The more important industrial processes are studied with a view to the general chemistry involved and to the various types of apparatus necessary to carry out the chemical reactions. The student is given a broad survey of the field of chemical industry and a knowledge of the relationships of the different industries to one another. The industries studied include the production of acids, alkali, fertilizers, glass, pigments, cements, soap, explosives, paper, petroleum, illuminating gas, and other general chemicals.

MR. BAKER.

47-2 INDUSTRIAL CHEMISTRY LABORATORY

Curriculum: IV — *Preparation: 47-1, taken concurrently*

Fourth year, both semesters — *Four hours per week*

The quantitative study of the preparation and purification of a small number of chemical products, selected as types of reactions of industrial importance. The processes employed are carefully controlled, and the final products are analyzed to determine their purity. When the work is completed, a careful detailed report of each process is made and discussed in class.

MR. BAKER.

48-1 PHYSICAL CHEMISTRY

Curriculum: IV — *Preparation: 42-1, 43-1, 44-1*

Fourth year, both semesters — *Four hours per week*

The more important principles of Theoretical Chemistry are treated with great thoroughness and are illustrated by applying them to a large number of problems. During the course the following subjects are considered: derivation of molecular and atomic weights, derivation of formulae, properties of substances in the gaseous state, laws of solution, solutions of ionized substances, equilibrium of homogeneous systems, kinetics of reactions, phase rule diagrams, and thermochemistry.

MR. PERKINS.

DEPARTMENT OF ADMINISTRATIVE ENGINEERING

50-1 INDUSTRIAL ORGANIZATION

Curriculum: V — *Preparation: — —*

Third year, first semester — *Two hours per week*

This course takes up the types of business organization, including the individual enterprise, the partnership, the corporation, the joint stock company, and the legal trust. A study is made of the advantages of combinations and the effect of legal regulations.

PROFESSOR BENEDICT.

50-2 INDUSTRIAL FINANCE

Curriculum: V — *Preparation: 50-1*
Third year, second semester — *Two hours per week*

A continuation of Industrial Organization 50-1, with the addition of problems of promotion, underwriting, and general financing, common to all types of business.

PROFESSOR BENEDICT.

50-3 CORPORATIONS

Curriculum: V — *Preparation: 50-2*
Third year, summer term — *Five hours per week*

Several particular cases of large corporations are taken up from the financial standpoint of their success, or of their failure and reorganization.

50-4 BUSINESS MANAGEMENT

Curriculum: V — *Preparation: 50-2*
Fourth year, first semester — *Three hours per week*

The course consists of discussions and problems in physical arrangements of manufacturing plants and office management as related to production.

50-5 MARKETING

Curriculum: V — *Preparation: — —*
Fourth year, first semester — *Three hours per week*

This subject treats of market and trade channels, territorial divisions, the selection, training, and equipment of salesmen, advertising and publicity work, and other problems of selling the manufactured product.

50-6 BUSINESS ADMINISTRATION

Curriculum: V — *Preparation: 50-4*
Fourth year, second semester — *Three hours per week*

A study of the operation of manufacturing enterprises for profit. The details of the manufacturing departments, including time study and rate setting, together with related functions of employment, stores control, and shipping are taken up in detail.

51-1 PRINCIPLES OF ACCOUNTING

Curriculum: V — *Preparation: — —*
Third year, first semester — *Three hours per week*

The intention is not to train the student to be a professional bookkeeper or auditor, but to promote an understanding of financial reports. Problems are given in double-entry bookkeeping, debits and credits, balance sheets, and profit and loss statements.

MR. GOODRIDGE.

51-2 COST ACCOUNTING

Curriculum: V — *Preparation: 51-1*
Third year, summer term — *Ten hours per week*

The student is made familiar with the chief principles relating to the design of cost systems for manufacturing concerns, the distribution of overhead expense, and the various methods of following the cost of labor and materials on individual items of production.

52-1 BANKING AND SECURITIES

Curriculum: V — *Preparation: — —*
Third year, second semester — *Three hours per week*

Some of the topics considered are: national banks, trust companies, savings banks, clearing houses, loans, the money market, foreign exchange, securities, the construction of bond tables, sinking fund calculations, stock and produce exchanges.

MR. GOODRIDGE.

53-1 BUSINESS LAW

Curriculum: V — *Preparation: — —*
Fourth year, second semester — *Two hours per week*

The course consists of a general treatment of law and its application to business, considering in particular the laws governing contracts, agency and negotiable instruments.

COURSES OF INSTRUCTION

No.	SUBJECT	Credit Hours	Curriculum	Year
010-1	English	50	All	1
011-1	German	20	IV	2
011-2	German	20	IV	3
012-1	History of Science	15	I, II, III, V	3
013-1	Government	20	All	3
014-1	Economics	20	All	3
020-1	College Algebra	30	All	1
021-1	Trigonometry	35	All	1
022-1	Analytic Geometry	40	All	1
023-1	Differential Calculus	35	All	2
023-2	Integral Calculus	35	All	2
030-1	Physics	10	All	1
031-1	Physics	35	All	1
032-1	Light	30	All	2
033-1	Heat	30	All	2
034-1	Physics Laboratory	10	All	1
034-2	Physics Laboratory	10	All	2
034-3	Physics Laboratory	10	All	2
041-1	Mechanical Drawing	25	All	1
041-2	Mechanical Drawing	20	I, IV	1
041-3	Mechanical Drawing	40	II, III, V	1
042-3	Machine Drawing	30	II, V	2
042-5	Engineering Drawing	40	I, III*, IV	3
043-1	Descriptive Geometry	30	I, II, III, V	1
044-2	Mechanism	25	II, V	2
044-3	Mechanism	55	II, V	2
050-1	Engineering Conference	60	All	2, 3, 4
052-1	Thesis	30	All	4
060-1	Physical Training	20	All	1
11-1	Surveying	35	I	1
11-2	Surveying	35	I	1
11-3	Surveying, Field and Practice	25	I	1
11-4	Surveying, Field and Practice	25	I	1
11-5	Surveying	30	I	2
11-6	Surveying, Field and Practice	25	I	2
11-7	Surveying	35	V	1
11-8	Topographical Drawing	15	I, V_1	3
12-1	Railroad Surveying	30	I	2
12-2	Railroad Surveying, Field and Practice	25	I	2
12-3	Railroad Engineering	30	I	3
12-4	Railroad Engineering, Field and Practice	30	I	3
13-1	Hydraulics	30	I, II, V_1	3
13-2	Hydraulic Motors	30	II, III*	3, 4*
13-3	Hydraulics	30	III, IV, V_2*	3, 4*
14-1	Theory of Structures	40	I, V_1	3
14-2	Structural Drawing	25	I, V_1	3
14-3	Engineering Structures	65	I, V_1	4
14-4	Structural Design	40	I, V_1	4
15-1	Concrete	35	I, II	4
15-2	Concrete Design	25	I, II	4
16-1	Materials	20	I, II, V	4
16-2	Testing Materials Laboratory	20	I, V_1	3
16-3	Foundations	20	I	4
16-4	Geology	20	I, V_1	3
17-1	Highway Engineering	20	I	4
21-1	Applied Mechanics	30	All	2
21-2	Applied Mechanics	30	All	2
21-3	Strength of Materials	70	I, II, V	3
21-4	Strength of Materials	35	III, IV	3
22-1	Graphical Analysis	45	II, V_2	3
22-2	Machine Design	45	II, V_2	3
22-3	Machine Design	80	II, V_2	4
22-5	Mechanisms of Machines	30	II	3
23-1	Heat Engineering	60	II, III, V_2	3
23-2	Engineering Laboratory	20	III	4

* Curriculum and year as indicated.

No.	SUBJECT	Credit Hours	Curriculums	Year
23-3	Heat Engineering	30	I, IV	3
23-4	Steam Turbines	15	II	3
23-5	Heat Engineering	30	II	4
23-6	Engineering Laboratory	20	II	3
24-1	Production Engineering	35	II, V	1
24-2	Production Engineering	35	II, V	1
24-3	Power Plant Equipment	35	II	3
24-4	Power Plant Engineering	35	II, V_2	4
24-6	Standard Eng. Products and Processes	20	II, III	4
25-1	Industrial Plants	90	II, V_2	4
30-1	Elements of Electricity	30	I, II, IV, V	2
30-3	Applied Electricity	30	I, II, IV, V	2
30-4	Applied Electricity Laboratory	40	I, II, IV, V	2
31-1	Elements of Electrical Engineering	30	III	1
32-1	Electrical Engineering I	40	III	1
32-3	Electrical Engineering II	90	III	2
32-4	Electrical Engineering II, Laboratory	80	III	2
32-6	Electrical Engineering III, Laboratory	60	III	3
32-7	Electrical Engineering III	90	III	3
32-8	Electrical Engineering IV, Laboratory	90	III	4
32-9	Electrical Engineering IV	90	III	4
33-1	Electrical Measurements	60	III	3
33-2	Electrical Measurements Laboratory	20	III	3
34-1	Electrical Engineering V	90	III	4
35-1	Advanced Electricity	30	III	4
40-1	Inorganic Chemistry	30	I*, II, III	1, 3*
41-1	Inorganic Chemistry	60	IV	1
41-2	Inorganic Chemistry Laboratory	40	IV	1
42-1	Qualitative Analysis	35	IV	1
42-2	Qualitative Analysis Laboratory	30	IV	1
43-1	Quantitative Analysis	40	IV	2
43-2	Quantitative Analysis Laboratory	50	IV	2
44-1	Technical Analysis	30	IV	3
44-2	Technical Analysis Laboratory	25	IV	3
44-3	Technical Analysis	30	IV	3
45-1	Organic Chemistry	70	IV	3
45-2	Organic Chemistry Laboratory	50	IV	3
45-3	Organic Chemistry	70	IV	4
45-4	Organic Chemistry Laboratory	60	IV	4
46-2	Chemical Engineering	30	IV	3
46-3	Chemical Engineering	70	IV	4
47-1	Industrial Chemistry	70	IV	4
47-2	Industrial Chemistry Laboratory	40	IV	4
48-1	Physical Chemistry	80	IV	4
50-1	Industrial Organization	25	V	3
50-2	Industrial Finance	25	V	3
50-3	Corporations	15	V	3
50-4	Business Management	50	V	4
50-5	Marketing	50	V	4
50-6	Business Administration	50	V	4
51-1	Principles of Accounting	35	V	3
51-2	Cost accounting	25	V	3
52-1	Banking and Securities	35	V	3
53-1	Business Law	35	V	4

* Curriculum and year as indicated.

THESES

Class of 1921

ABRAMSON, SAMUEL — *Chemical Engineering*
Revivification of Fuller's Earth by a Decolorization Method.

ABROMSON, HARRY PHILIP (with O. Abromson) — *Chemical Engineering*
Design of a Plant for the Salem Gas Light Company for Producing Creosoting Oil.

ABROMSON, ONNE (with H. P. Abromson) — *Chemical Engineering*
Design of a Plant for the Salem Gas Light Company for Producing Creosoting Oil.

ALBERTS, SAMUEL (with C. E. Hills) — *Electrical Engineering*
Separation of Iron Losses in a Transformer.

ATKINSON, RALPH — *Chemical Engineering*
Humidity Equilibrium of Common Substances.

BROWN, MARTIN — *Mechanical Engineering*
The Arrangement of a Series of Engineering Laboratory Experiments for the Students of Northeastern College.

CATES, LOUIS G. (with S. Levine) — *Civil Engineering*
Design of a Viaduct (Part of Plans of Boston Elevated Railway Extension, Dorchester, Mass.)

CHENEY, NORMAN (with C. E. Mead) — *Mechanical Engineering*
Efficiency Tests of an Indian Motorcycle Engine.

CLEMENTS, GEORGE (with R. Spear) — *Civil Engineering*
An Investigation of Dangerous Conditions Existing at Great Head, Winthrop, Mass., with Plans and Designs for the Solution of the Problem.

COOPER, R. DUNHAM — *Mechanical Engineering*
A Study of the Power Plant of a Ship.

CRAMER, GEORGE W. (with W. C. Richards) — *Civil Engineering*
Investigation of an Impounding Reservoir.

CUNDARI, FRANK A. — *Civil Engineering*
Design of a Through Plate Girder Bridge on the Midland Division of the N. Y., N. H. and H. R. R. at Southampton Street, Boston.

DOANE, KENDRICK P. (with H. M. Wilkins) — *Civil Engineering*
Reinforced Concrete Arch Highway Bridge for Proposed Road over Muddy River in the Back Bay Fens, Boston, Mass.

FEARING, EDWARD W. (with F. H. LaBree) — *Electrical Engineering*
The Investigation of Electrical Grounds.

GINDER, CHESTER J. — *Civil Engineering*
Design of Reinforced Concrete Garage to be Located Corner of Huntington Avenue and Greenleaf Streets, Boston.

GORDON, MORRIS J. — *Chemical Engineering*
An Electrolytic Method of Determining Arsenic Quantitatively.

HEAP, SHELDON I. — *Electrical Engineering*
An Investigation of a Counterpoise as used in Amateur Radio Telegraphy.

HILLS, CHARLES E., JR. (with S. Alberts) — *Electrical Engineering*
Separation of Iron Losses in a Transformer.

HOWE, MYRON A. (with G. F. Perry) — *Civil Engineering*
Design of Through Riveted Highway Bridge Over Sebethe River Between Towns of Middletown and Cromwell, Conn.

KEITH, JAMES B. — *Chemical Engineering*
A Study of the Complex Amonic—Cobalt Salts and the Preparation of a Roseo—Cobaltic Chloride.

LaBree, Frank H. (with E. W. Fearing) *Electrical Engineering*
The Investigation of Electrical Grounds.

Landry, Herbert A. (with V. R. Peterson) *Mechanical Engineering*
The Design of a 250-pound Household Refrigeration Unit.

Latanzi, Alfred *Civil Engineering*
Design of a Mill Building.

Levine, Samuel (with L. G. Gates) *Civil Engineering*
Design of a Viaduct (Part of Plans of Boston Elevated Railway Extension, Dorchester, Mass.

Marsh, Charles C. *Electrical Engineering*
Distribution of Voltage Around the Commutator of a Given Machine.

Meade, Carl E. (with N. E. Cheney) *Mechanical Engineering*
Efficiency Tests of an Indian Motorcycle Engine.

Nickerson, Clarence W. *Mechanical Engineering*
Principles of Scientific Management, designed to increase the Efficiency of the Sanborn Company of Boston, Mass., Manufacturers of Scientific Instruments.

Peterson, Vernon R. (with H. A. Landry) *Mechanical Engineering*
The Design of a 250-pound Household Refrigeration Unit.

Perry, Gilbert F. (with M. A. Howe) *Civil Engineering*
Design of a Through Riveted Highway Bridge Over Sebethe River Between Towns of Middletown and Cromwell, Conn.

Phipps, Chester D. *Mechanical Engineering*
The Constant-Volume-During-Firing Internal Combustion Engine.

Prives, Hyman S. *Chemical Engineering*
The Determination of Ammonia, Pyridine, Pyriole, and Quinoline in Bone Oil.

Richards, Walter C. (with G. W. Cramer) *Civil Engineering*
Investigation of an Impounding Reservoir.

Santis, Julius C. *Chemical Engineering*
The Manufacture of White Lead by Electrolysis.

Spear, Roger (with G. Clements) *Civil Engineering*
An Investigation of Dangerous Conditions Existing at Great Head, Winthrop, Mass., with Plans and Designs for the Solution of the Problem.

Standley, David (with M. Staples) *Civil Engineering*
Design of a Reinforced Concrete Coal Trestle.

Staples, Merton (with D. Standley) *Civil Engineering*
Design of a Reinforced Concrete Coal Trestle.

Sullivan, John J. *Electrical Engineering*
The Design of a Hydro Electric Power Plant.

Werth, Lloyd L. *Mechanical Engineering*
Design and Construction of a Toric Lens Polishing Machine.

Wilkins, Henry M. (with K. P. Doane) *Civil Engineering*
Reinforced Concrete Arch Highway Bridge for Proposed Road Over Muddy River in the Back Bay Fens, Boston, Mass.

REGISTER OF STUDENTS

Enrolled During the School Year 1922-1923

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Abramovitz, Julius	C. E.	1925	*Malden*
Aimo, Karl H.	C. E.	1923	*Allston*
Ainsleigh, Charles W., Jr.	A. E.	1925	*Atlantic*
Alden, Edgar O.	E. E.	1925	*East Saugus*
Alderman, Leon D.	M. E.	1924	*Beverly*
Alexander, William T.	A. E.	1925	*No. Harpswell, Me.*
Allan, Charles R.	M. E.	1923	*Pittsfield*
Allan, William W.	C. E.	1924	*Jamaica Plain*
Allen, Earle C.	C. E.	1922	*Holbrook*
Almoin, Nerses A.	Ch. E.	1925	*Newburyport*
Alpers, Moses	Ch. E.	1925	*Salem*
Alves, John J.	M. E.	1922	*Provincetown*
Anderson, Arthur C.	M. E.	1925	*Weymouth*
Anderson, Carl R.	M. E.	1925	*Orange*
Anderson, E. Allen	Ch. E.	1924	*Norwood*
Anderson, Henry G.	M. E.	1924	*West Roxbury*
Anderson, Oscar W.	A. E.	1925	*Hyde Park*
Andrew, Phillip J.	E. E.	1925	*Ayer*
Anthony, Sidney S.	C. E.	1925	*Manchester, N. H.*
Arata, Claude J.	E. E.	1923	*Hallowell, Me.*
Ash, Clarence, D.	Ch. E.	1925	*Somerville*
Auld, Eugene G.	Ch. E.	1925	*Everett*
Ayer, Raymond B.	E. E.	1925	*Plainville*
Baader, Albert S.	E. E.	1924	*Everett*
Bacon, Robert E.	E. E.	1925	*Nobscot*
Bailey, Arthur H.	M. E.	1924	*Brookfield*
Bailey, Louis M.	E. E.	1923	*South Duxbury*
Bailey, Percy W.	E. E.	1922	*Kingston*
Baker, Charles G.	E. E.	1924	*Georgetown*
Baker, John M., Jr.	C. E.	1925	*Swampscott*
Baker, William F.	E. E.	1924	*Charlestown*
Baldi, Hugo A.	C. E.	1925	*Everett*
Ballou, George D.	C. E.	1922	*Boston*
Baratta, Edmund A.	C. E.	1925	*Everett*
Barber, Dana H.	M. E.	1924	*Newton*
Barker, Edward H.	E. E.	1925	*East Bridgewater*
Barnett, Stewart K.	C. E.	1925	*East Douglas*
Barney, Kenneth M.	E. E.	1924	*Dorchester*
Barrett, Roger N.	E. E.	1924	*Marlboro*
Barry, John J.	E. E.	1924	*Salem*
Barry, Thomas H.	A. E.	1925	*Salem*
Bartlett, Charles H.	C. E.	1925	*Roslindale*
Bartlett, James H., Jr.	C. E.	1924	*Quincy*
Bartlett, Lothrop B.	Ch. E.	1925	*East Walpole*
Barton, Kenneth L.	A. E.	1925	*Meriden, N. H.*
Baruffaldi, Lawrence	C. E.	1925	*Somerville*
Batchelder, Raymond	E. E.	1925	*Manchester, N. H.*
Bates, Charles Laurance	E. E.	1925	*Whitman*
Bates, Kimball S.	E. E.	1924	*Huntington*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Beard, Weldon N.	E. E.	1925	*Melrose Highlands*
Bearse, Allen H., Jr.	A. E.	1925	*Melrose*
Bearse, Richard C.	Ch. E.	1923	*Springfield*
Beattie, Robert	M. E.	1924	*Everett*
Becker, Abraham A.	Ch. E.	1923	*Cambridge*
Bell, Holton C.	M. E.	1925	*Beverly*
Bender, Albert V.	E. E.	1925	*Dorchester*
Benson, Gordon E.	E. E.	1925	*Upton*
Benson, Raymond H.	M. E.	1924	*Athol*
Berlyn, Lewis	E. E.	1923	*Salem*
Berman, Benjamin J.	Ch. E.	1925	*Quincy*
Berman, Harold A.	E. E.	1925	*Roxbury*
Berman, Isidor	Ch. E.	1925	*Lexington*
Berquist, John W.	Ch. E.	1925	*Arlington*
Berry, Earl R.	E. E.	1925	*Worcester*
Bertini, George E.	C. E.	1925	*Everett*
Besson, Ralph E.	M. E.	1923	*Lynn*
Bezanson, Irving E.	A. E.	1925	*Milton*
Bigelow, Cecil H.	M. E.	1923	*Monument Beach*
Bigelow, Maurice H.	Ch. E.	1924	*Concord*
Bikofsky, Isidor	A. E.	1925	*Boston*
Bingham, Lloyd A.	E. E.	1924	*Middlebury, Vt.*
Birch, William T. A.	E. E.	1925	*Gray, Me.*
Bissett, John E.	E. E.	1925	*Quincy*
Blair, Laurence C.	C. E.	1925	*Petersham*
Blake, Howard J.	Ch. E.	1924	*Boston*
Bliss, Theodore B.	Ch. E.	1923	*Jamaica Plain*
Blodgett, Newton K.	E. E.	1925	*Canaan, Vt.*
Bluemer, Edwin F.	A. E.	1924	*Brookfield*
Bodemer, Philip E.	C. E.	1924	*Cambridge*
Boden, Arthur T.	E. E.	1923	*Beverly*
Bonazzoli, August G.	Ch. E.	1925	*Bolton*
Boothroyd, Edwin	E. E.	1925	*Fall River*
Bouchard, George H.	Ch. E.	1924	*Topsfield*
Boyd, Ronald A.	E. E.	1924	*Taunton*
Boyd, Thomas P.	M. E.	1922	*Chelsea*
Bradbury, Rolfe C.	Ch. E.	1925	*Cliftondale*
Bradbury, Raymond J.	M. E.	1922	*New Britain, Conn.*
Bradford, Cecil B.	M. E.	1924	*Plainfield, Conn.*
Bradshaw, Alfred O.	C. E.	1924	*Amesbury*
Bradstreet, Raymond,	Ch. E.	1923	*Middleton*
Braica, Anthony A.	C. E.	1925	*Springfield*
Bramble, James L.	Ch. E.	1925	*Pittsfield*
Brask, Henry	C. E.	1923	*Attleboro*
Bray, Wesley R.	C. E.	1925	*Torrington, Conn.*
Breen, John J.	Ch. E.	1924	*Rockport*
Brennan, James F.	M. E.	1923	*Salem*
Bresson, Jules G.	C. E.	1925	*Torrington, Conn.*
Brewer, Arthur	M. E.	1924	*Bar Harbor, Me.*
Britchky, Hyman	Ch. E.	1922	*Foxboro*
Broadley, William A.	E. E.	1925	*East Walpole*
Brooks, Curtis C.	M. E.	1924	*North Hanover*
Brooks, Francis W.	M. E.	1922	*Belmont*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Brooks, John S.	M. E.	1924	*North Hanover*
Brown, Alfred	Ch. E.	1924	*Everett*
Brown, Bernard C.	C. E.	1924	*Georgetown*
Brown, Earl L.	C. E.	1925	*Sanford, Me.*
Brown, Gilbert M.	A. E.	1925	*Amherst*
Brown, James G.	M. E.	1924	*Wakefield*
Brown, Ralph E.	E. E.	1922	*Rockland*
Brown, Richard B.	E. E.	1922	*Plymouth*
Brown, Walter C.	E. E.	1925	*Dorchester*
Bruce, Alfred G.	E. E.	1925	*Belfast, Me.*
Bruce, Herbert A.	C. E.	1925	*Watertown*
Bryant, Everett H.	E. E.	1925	*E. Templeton*
Buck, Harold A.	C. E.	1925	*Springfield*
Bullard, Edmund H.	E. E.	1925	*Medfield*
Burbeck, Stanley O.	M. E.	1924	*Woodsville, N. H.*
Burke, George L.	C. E.	1924	*Norwood*
Burke, Walter F.	A. E.	1925	*Dorchester*
Burns, Rolfe W.	C. E.	1924	*Erie, Pa.*
Bushnell, Laverne	A. E.	1923	*Dedham*
Butterworth, Percy T.	E. E.	1923	*Boston*
Campbell, Malcolm K.	C. E.	1925	*Somerville*
Campbell, Oscar J.	M. E.	1924	*Hudson, N. H.*
Carl, James W.	M. E.	1922	*Cambridge*
Carlsen, Fred H.	E. E.	1922	*Gloucester*
Carroll, Frank J.	E. E.	1925	*Taunton*
Carroll, Francis R.	Ch. E.	1923	*Cambridge*
Carson, Forest A.	E. E.	1925	*Waltham*
Carswell, Atlee	A. E.	1925	*Manchester*
Caswell, Orville G.	M. E.	1923	*East Lynn*
Chandler, Henry W.	E. E.	1925	*Nahant*
Chapman, Allen E.	E. E.	1924	*Stoneham*
Chase, Charles S.	E. E.	1922	*Leicester*
Chase, Fred W., Jr.	C. E.	1924	*Newburyport*
Chauvey, Alfred A.	E. E.	1925	*Norwood*
Chilson, Warren A.	Ch. E.	1924	*Milford*
Chouinard, Louis	C. E.	1924	*Thompsonville, Conn.*
Christenson, Edward R.	C. E.	1925	*Lee*
Clark, Charles H.	M. E.	1925	*Medfield*
Clark, Raymond F.	E. E.	1925	*North Abington*
Clark, William M.	M. E.	1925	*Hanover*
Clarke, Harry J.	E. E.	1925	*Wallingford, Conn.*
Clarke, Kenneth O.	E. E.	1922	*Kingston*
Clarke, Robert H.	M. E.	1923	*Melrose Highlands*
Clarke, William R.	E. E.	1924	*Wallingford, Conn.*
Cleaves, Royden F.	M. E.	1924	*Rochester, N. H.*
Cleaves, Wynne P.	Ch. E.	1924	*Waltham*
Clement, John D., Jr.	E. E.	1925	*Waltham*
Clerke, Philip N.	E. E.	1925	*Lynn*
Cobb, Norman E.	M. E.	1925	*Calais, Me.*
Cobban, John D.	M. E.	1924	*Groveland*
Coburn, Wendell F.	Ch. E.	1924	*Braintree*
Coffin, Charles C.	M. E.	1924	*Nantucket*
Colbert, John A.	C. E.	1924	*Somerville*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Colburn, Hardy R.	M. E.	1924	*Boston*
Cole, Donald G.	E. E.	1925	*Windsor, Vt.*
Collins, Desmond M.	M. E.	1922	*Dorchester*
Colpitts, Aubrey K.	M. E.	1925	*Alma, N. B., Canada*
Comfort, Robert F.	A. E.	1925	*Winchester*
Connell, John H.	Ch. E.	1923	*Roxbury*
Connor, Wilbert H.	C. E.	1925	*Orient Heights*
Cook, Bernard L.	E. E.	1925	*Medford*
Cook, Hiram J.	M. E.	1923	*Franklin*
Cook, Harold S.	C. E.	1922	*Boston*
Cooke, Howard W.	E. E.	1922	*Athol*
Cooke, Joseph W.	E. E.	1925	*Goshen, Conn.*
Coombs, Seldon P.	M. E.	1922	*Medford*
Cooper, Charles S.	C. E.	1924	*Dorchester*
Cooper, George I.	Ch. E.	1924	*Dorchester*
Copeland, George R.	A. E.	1925	*Somerville*
Corliss, Theodore A.	A. E.	1925	*Somerville*
Corsano, Nicholas A.	A. E.	1925	*East Boston*
Courlang, Maurice	E. E.	1925	*Boston*
Cox, Allan N.	Ch. E.	1924	*Wellesley*
Crafts, Harold W.	E. E.	1924	*Ashfield*
Cragin, Donald G.	A. E.	1925	*Framingham*
Cramb, Lester P.	E. E.	1925	*Melrose*
Crankshaw, Edwin	E. E.	1925	*Fall River*
Cressey, Dustin G.	E. E.	1922	*Malden*
Crockett, Elton G.	E. E.	1925	*Plainville*
Cross, Robert C.	M. E.	1925	*West Springfield*
Crossman, Hartwell H.	C. E.	1923	*Barrowsville*
Cruttenden, William B.	Ch. E.	1924	*Watertown, Conn.*
Cummings, John J.	C. E.	1923	*Roxbury*
Cummings, Roscoe L.	Ch. E.	1924	*Belmont*
Cundari, Joseph V.	C. E.	1924	*South Boston*
Cunningham, Linwood S.	C. E.	1924	*Burlington, Vt.*
Curra, Leonard A.	Ch. E.	1925	*Canton*
Curran, Francis M.	M. E.	1924	*Holyoke*
Cushing, Levi G.	E. E.	1923	*South Duxbury*
Cushing, Samuel	E. E.	1925	*Cambridge*
Cushing, Samuel A.	E. E.	1924	*Beverly*
Cutler, Wallace E.	E. E.	1925	*Franklin, N. H.*
Cutting, Clifford B.	M. E.	1925	*Melrose*
Damiani, Roland	C. E.	1924	*Beverly*
Damon, Donald B.	Ch. E.	1923	*Keene, N. H.*
Dane, Harry S.	Ch. E.	1925	*Roxbury*
Daniels, James W.	C. E.	1925	*Lupton, Mich.*
Davey, Frank H.	E. E.	1925	*New London, Conn.*
Davidson, Edward E.	M. E.	1925	*Everett*
Davidson, Edwin F.	Ch. E.	1925	*Atlantic*
Davis, Leon P.	C. E.	1923	*Kennebunk, Me.*
Davis, Robert F.	M. E.	1925	*Somerville*
Davis, Stuart S.	E. E.	1922	*Beverly*
Dawe, Allen S.	C. E.	1923	*Cambridge*
Day, George W.	E. E.	1925	*Boston*
Day, John L., Jr.	C. E.	1925	*Roslindale*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Day, Wallace C.	C. E.	1925	*Springfield*
Dearborn, Elmore L.	C. E.	1922	*Hampton, N. H.*
DeMillia, Guy N.	E. E.	1925	*Cambridge*
Dickerman, Ralph T.	C. E.	1925	*Taunton*
Dickson, Franklin B.	E. E.	1925	*Milton, N. H.*
Dickson, Richard M.	A. E.	1924	*Holyoke*
Diggs, George L.	E. E.	1924	*Norwood*
D'Italia, Raymond	E. E.	1925	*Medford Hillside*
Dixon, Herbert C.	C. E.	1923	*Gloucester*
Doherty, Arthur H.	C. E.	1925	*Natick*
Dolan, Lawrence E.	E. E.	1925	*Middlebury, Vt.*
Donnelly, Robert L.	C. E.	1923	*Beverly*
Douglas, Alton L.	A. E.	1923	*East Hiram, Me.*
Downey, Ralph S.	M. E.	1922	*Hingham*
Drew, Edwin C.	E. E.	1925	*Marshfield Hills*
Driscoll, John J.	E. E.	1925	*Framingham*
Drislane, William F.	Ch. E.	1924	*Lynn*
Dunlap, William F.	C. E.	1925	*Plymouth*
Dunlevy, John J.	Ch. E.	1925	*Newton*
Dunn, James E.	Ch. E.	1925	*Salem*
Durgin, Harold L.	C. E.	1924	*Kittery, Me.*
Duston, Carmillus W.	M. E.	1923	*Framingham*
Dyer, Russell H.	C. E.	1925	*Dorchester*
Dyson, Charles A.	M. E.	1924	*Springfield*
Eastman, Harlow V.	E. E.	1924	*Ossipee, N. H.*
Eaton, Spencer E.	C. E.	1925	*Taunton*
Edgar, Robert C.	C. E.	1925	*Dorchester*
Eldridge, Gordon B.	Ch. E.	1924	*Concord*
Eldridge, Raymond	E. E.	1925	*Ashland*
Elliott, Frank R.	Ch. E.	1924	*Springfield*
Ellis, Lawrence B.	Ch. E.	1925	*Whitman*
Ellis, Russell F.	M. E.	1924	*Milldale, Conn.*
Ellms, Lindsay	E. E.	1923	*Cohasset*
Ely, Rodney, B.	C. E.	1924	*Centerbrook, Conn.*
Emery, Carl B.	C. E.	1924	*Portland, Me.*
Engstrand, Waldo	E. E.	1923	*Cranston, R. I.*
Engstrom, Howard T.	Ch. E.	1922	*Plymouth*
Erickson, Robert	M. E.	1925	*Fitchburg*
Ericson, Frederic O.	M. E.	1925	*Beverly*
Erskine, James S.	E. E.	1923	*Newburyport*
Everett, Albert E.	C. E.	1923	*Everett*
Ewell, Frederick A.	E. E.	1924	*Medford*
Fairbrother, Russell	Ch. E.	1925	*Bangor, Me.*
Faunce, Lawrence S.	M. E.	1922	*E. Rochester, N. H.*
Falt, Gordon H.	E. E.	1924	*Northeast Harbor, Me.*
Ferguson, Arthur W.	E. E.	1924	*Everett*
Ferguson, George F.	Ch. E.	1925	*E. Weymouth*
Fitzpatrick, Joseph B.	C. E.	1923	*Somerville*
Flanders, Henry R.	E. E.	1923	*Vineyard Haven*
Flood, Frank L.	C. E.	1922	*Framingham*
Flynn, Roland W.	A. E.	1925	*Concord Junction*
Foisie, George E.	C. E.	1923	*Nashua, N. H.*
Foley, Harold E.	E. E.	1925	*Everett*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Ford, James B.	E. E.	1924	*Melrose*
Foster, Harry B.	E. E.	1924	*Medford*
Foster, Kenneth E.	M. E.	1925	*Saugus*
Fowler, Earl W.	E. E.	1925	*Westfield*
Fowler, William H.	C. E.	1922	*Melrose*
Fox, F. Sumner	E. E.	1922	*Newburyport*
Fraser, William A.	E. E.	1923	*Jamaica Plain*
Frazee, Walter E.	E. E.	1924	*Medford*
Frazier, Stuart D.	Ch. E.	1925	*Hyde Park*
Freedman, Max D.	Ch. E.	1925	*Athol*
Freeman, Isadore,	Ch. E.	1924	*Winthrop*
Freeman, James A.	C. E.	1924	*Attleboro Falls*
French, Benjamin H.	E. E.	1925	*Boston*
French, Murvin A.	E. E.	1925	*Framingham*
Friend, Omar W.	C. E.	1925	*No. Anson, Me.*
Frost, George	E. E.	1924	*West Lynn*
Frye, Harold B.	A. E.	1925	*Roxbury*
Frye, Richard F.	M. E.	1922	*Athol*
Fuller, John, Jr.	Ch. E.	1925	*Quincy*
Fundin, Hjalmar O. E.	M. E.	1923	*Mattapan*
Furrier, Joseph P.	C. E.	1923	*Lynn*
Gaffey, Francis J.	M. E.	1922	*Salem*
Gallagher, G. T.	C. E.	1925	*Dorchester*
Gallop, Myron E.	E. E.	1925	*Ridlonville, Me.*
Gandreau, Louis E.	M. E.	1925	*New London, Conn.*
Gannett, Paul R.	E. E.	1925	*Scituate*
Gargaro, Alfred A.	C. E.	1923	*West Quincy*
Garney, Emery W.	C. E.	1924	*Bridgewater*
Garr, Isadore	A. E.	1925	*Dorchester*
Gaylord, Richard N.	E. E.	1925	*Westfield*
Gerber, Nathan	M. E.	1925	*Roxbury*
Gilbert, Merton L.	E. E.	1923	*Cohasset*
Gillis, Paul D.	C. E.	1925	*Watertown*
Gilman, Cecil E.	Ch. E.	1925	*Madison, N. H.*
Gilson, Thomas S.	A. E.	1925	*Windsor, Vt.*
Given, Sidney H.	C. E.	1925	*W. Somerville*
Gladding, Richard S.	Ch. E.	1922	*Beverly*
Gleason, Carl B.	Ch. E.	1923	*Marblehead*
Goddard, George W.	M. E.	1924	*Somerville*
Gold, Meyer	E. E.	1924	*Avon, Conn.*
Golden, Martin F.	C. E.	1925	*Dorchester*
Gordon, Phineas	C. E.	1923	*Boston*
Gould, Joseph E.	Ch. E.	1922	*Roxbury*
Goulet, Narcisse T.	Ch. E.	1922	*Pawtucket, R. I.*
Grady, James T.	E. E.	1925	*South Boston*
Graham, Elmer W.	E. E.	1925	*Dorchester*
Graham, Warren J.	M. E.	1924	*Marlboro*
Gray, Ernest W.	Ch. E.	1923	*Scituate*
Gray, Wilbur S.	E. E.	1925	*Salem*
Grenier, Francis	Ch. E.	1925	*North Adams*
Grigas, Jasper C.	A. E.	1925	*Nashua, N. H.*
Grover, J. Madison	Ch. E.	1925	*Wellesley*
Grozier, John W.	E. E.	1923	*Foxboro*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Grushky, Maurice	C. E.	1924	*Beverly*
Gunther, Frederick E.	E. E.	1922	*Roslindale*
Hackett, James D.	E. E.	1925	*Watertown*
Haines, Joseph E.	M. E.	1924	*Boston*
Hale, Harold W.	C. E.	1922	*Swansea*
Hale, James E.	E. E.	1925	*Monson*
Hall, Chardon M.	M. E.	1925	*Winchendon*
Hall, Robert A.	E. E.	1924	*Brookline*
Hallam, Frank W.	E. E.	1925	*Winthrop*
Hamilton, Carroll L.	E. E.	1925	*Portland, Me.*
Hammond, Cleon C.	E. E.	1923	*Abington*
Hannable, Daniel W.	M. E.	1925	*Beverly Farms*
Harding, Arthur E.	C. E.	1922	*Boston*
Harlow, Elmer R.	C. E.	1924	*Plymouth*
Harrington, Elvin E.	A. E.	1925	*Milton*
Harrington, Frank C.	E. E.	1924	*So. Woodstock, Conn.*
Harris, George A. X.	M. E.	1925	*Cambridge*
Harris, Henry S.	Ch. E.	1925	*Allston*
Harvey, Ralph H.	E. E.	1925	*South Berwick, Me.*
Haskell, J. Reginald	M. E.	1924	*Webster*
Haskins, Elmer E.	M. E.	1925	*Dighton*
Haskins, Howard L.	M. E.	1924	*Wollaston*
Hatch, Douglas P.	M. E.	1923	*Lynn*
Hathaway, Chauncey E.	Ch. E.	1922	*Dorchester*
Havlicek, Joseph A.	C. E.	1925	*Middletown, Conn.*
Hawks, Robert A.	E. E.	1924	*Newton Centre*
Heald, Theodore B.	A. E.	1925	*Amherst*
Hearty, Herbert W., Jr.	A. E.	1925	*Dorchester*
Hedlund, Charles F.	E. E.	1925	*Braintree*
Heinlein, Martin L.	E. E.	1923	*South Natick*
Henry, Bernard D.	C. E.	1925	*Melrose*
Herlihy, John A.	C. E.	1925	*Wilton, N. H.*
Herrick, Benjamin H.	C. E.	1924	*Wollaston*
Hiatt, Frank C.	E. E.	1923	*Malden*
Hill, George B.	Ch. E.	1923	*Berlin, N. H.*
Hiltz, Walter M.	E. E.	1925	*Everett*
Hinckley, Herbert P.	M. E.	1925	*Manaroneck, N. Y.*
Hjelmberg, Arthur G.	M. E.	1923	*Boston*
Hoffman, Harry J.	E. E.	1924	*Jamaica Plain*
Holland, Carl T.	E. E.	1922	*Nantasket*
Hollis, Howard W.	E. E.	1925	*Wareham*
Holmes, Ashton B.	E. E.	1925	*Charlestown, N. H.*
Holthaus, Frederick J.	E. E.	1922	*Winthrop*
Hopkins, Forrest R.	M. E.	1923	*Newport, N. H.*
Hopkins, Howe H.	M. E.	1925	*Trenton, Me.*
Houghton, Norman R.	E. E.	1925	*Stoneham*
Hovenanian, Hovenan	Ch. E.	1925	*Cambridge*
Howard, John M.	E. E.	1924	*Providence, R. I.*
Hubbard, Howard M.	A. E.	1924	*Springfield*
Hubby, Leon F.	E. E.	1924	*Lee*
Hulsman, David L.	Ch. E.	1922	*Everett*
Hulsman, Kenneth G.	C. E.	1924	*Everett*
Huntington, Clarence M.	M. E.	1923	*Cambridge*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Ireland, Theodore S.	M. E.	1922	*Gloucester*
Ives, Walton S.	Ch. E.	1925	*Winthrop*
Jacobson, Howard	E. E.	1924	*Concord*
Jackson, John S.	Ch. E.	1925	*Lewiston, Me.*
Jaffe, Meyer R.	C. E.	1925	*North Adams*
Janes, George N.	E. E.	1925	*Cheslea*
Jenks, Donald G.	E. E.	1924	*Attleboro*
Jennings, Lawrence W.	A. E.	1923	*Winthrop*
Johnson, Donald	E. E.	1925	*Waltham*
Johnson, Evan	E. E.	1925	*Norwood*
Johnson, Henry D.	C. E.	1924	*Auburn, Me.*
Johnson, John E.	Ch. E.	1925	*Maynard*
Johnson, Joseph E.	A. E.	1923	*Roxbury*
Johnson, Theodore A.	C. E.	1925	*Marlboro*
Johnson, Walter A.	M. E.	1924	*Dorchester*
Jones, Archibald L.	E. E.	1923	*Middleton*
Jones, Henry C., Jr.	A. E.	1925	*Lowell*
Jones, Harold H.	C. E.	1923	*Swampscott*
Josephson, Harold C. W.	E. E.	1925	*Somerville*
Junior, Francis E.	C. E.	1922	*Plymouth*
Katzeff, Julius	Ch. E.	1925	*Winthrop*
Keene, Burton F.	E. E.	1923	*South Hanson*
Kelleher, James J.	M. E.	1922	*Salem*
Kelley, Charles E.	E. E.	1925	*Norwood*
Kelley, Harold W.	C. E.	1924	*Dorchester*
Kelley, Thomas G.	M. E.	1922	*Roslindale*
Kendrew, Albert E.	C. E.	1924	*Roxbury*
Kennedy, Parker R.	C. E.	1925	*Mattapan*
Kenney, David J.	C. E.	1923	*Boston*
Kenney, Francis B.	C. E.	1924	*Manchester, N. H.*
Kenney, John H.	A. E.	1923	*Boston*
Kershner, Walter L.	E. E.	1925	*Strong, Me.*
Keville, Leo A.	C. E.	1925	*Lowell*
Kimball, Carleton B.	E. E.	1925	*Salisbury*
Kimball, Donald S.	A. E.	1925	*Bridgewater*
King, Arthur M.	C. E.	1925	*Medway*
King, Earle	C. E.	1925	*Pottersville*
King, William H.	E. E.	1924	*Everett*
Klein, Morris	E. E.	1925	*Windsor, Vt.*
Knight, Robert H.	E. E.	1925	*Newbury*
Knight, Vernon H.	E. E.	1924	*Brockton*
Knopp, Otto R. H.	E. E.	1923	*E. Taunton*
Knudson, Carroll B.	E. E.	1925	*Boston*
Knuepfer, Charles F.	M. E.	1923	*Boston*
Kosak, Nathaniel	Ch. E.	1924	*Everett*
Krohn, Bertil W.	E. E.	1925	*W. Hartford, Conn.*
Kumpel, Edgar W.	C. E.	1924	*Everett*
LaMarche, Logan	C. E.	1924	*Cambridge*
Lamarine, Alfred E.	E. E.	1924	*Natick*
Lancaster, Elon F.	E. E.	1923	*Madison, Me.*
Landry, Ernest L.	E. E.	1925	*Thompsonville, Conn.*
Landy, George	E. E.	1925	*Boston*
Lane, Charles M., Jr.	E. E.	1924	*Hartford, Conn.*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Langstroth, Guy N.	C. E.	1924	*Boston*
Langtry, Chester F.	C. E.	1925	*Framingham*
Larson, C. William	M. E.	1923	*Worcester*
Lassof, Israel	Ch. E.	1924	*Lexington*
Latimer, William	A. E.	1924	*Leominster*
Laubenstein, Karl G.	Ch. E.	1924	*Maynard*
Lauretzen, Walter M.	Ch. E.	1924	*Mattapan*
Law, William H.	C. E.	1924	*Rockport*
Lawler, John D.	Ch. E.	1923	*Lowell*
Lawton, Robert C.	M. E.	1925	*Orwell, Vt.*
Leach, Donald F.	M. E.	1925	*Whitman*
Leacy, Eugene S.	M. E.	1925	*Watertown*
Leavitt, Curtis G.	C. E.	1924	*Taunton*
Leavitt, Howard L.	E. E.	1924	*Roxbury*
Lee, Alfred	E. E.	1924	*Lawrence*
Lee, I. Albert	E. E.	1922	*Salem*
Lee, Walter H.	C. E.	1922	*Dorchester*
Leggett, David J.	Ch. E.	1925	*Assinippi*
Lent, Stanley B.	Ch. E.	1925	*Dorchester*
Lessard, Theodore T.	C. E.	1925	*Springfield*
Letourneau, Roland F.	Ch. E.	1923	*Rockland*
Levin, Eli	Ch. E.	1923	*Roxbury*
Levine, Maurice	C. E.	1925	*Fall River*
Levy, Hyman	E. E.	1923	*Boston*
Lewis, Clarence W.	E. E.	1924	*Beverly*
Lewis, Ervin H.	E. E.	1923	*Newtonville*
Lewis, John B.	C. E.	1925	*Arlington Hts.*
L'Heureux, Joseph A.	C. E.	1925	*Lowell*
Libby, Channing	C. E.	1925	*East Weymouth*
Lindsay, Edward A.	M. E.	1924	*Wollaston*
Lindskog, Sidney W.	E. E.	1924	*Brockton*
Linell, Elmer G.	E. E.	1925	*Gardner*
Locash, Salvatore	C. E.	1925	*Wakefield*
Lockhart, Ralph C.	M. E.	1925	*Greenfield*
Locke, Roger P.	A. E.	1925	*Salem*
Lord, Forrest M.	E. E.	1925	*Sharon*
Loubris, Gaston E.	E. E.	1923	*Wakefield*
Lovejoy, Richard P.	Ch. E.	1922	*Franklin*
Low, Elmer F.	C. E.	1924	*Woodsford, Me.*
Lucas, Ernest H.	Ch. E.	1924	*Magnolia*
Lucy, Herbert S.	E. E.	1925	*Groton*
Luippold, John J.	M. E.	1925	*W. Roxbury*
Lundin, Erik H.	E. E.	1923	*Proctor, Vt.*
Lynch, Thomas J.	M. E.	1925	*Dorchester*
Mabey, Melvin	A. E.	1925	*Newton*
Macaulay, James E.	C. E.	1925	*Medford*
MácConnell, Norman J.	E. E.	1925	*Medford*
MacDonald, James V.	M. E.	1925	*Peabody*
MacDonald, Robert M. T.	M. E.	1924	*W. Roxbury*
MacKay, Chauncey D.	A. E.	1925	*Dorchester*
MacKinnon, Weber J.	E. E.	1925	*Meriden, Conn.*
MacLeod, Edward M.	E. E.	1925	*E. Dedham*
Macomber, Charles W.	E. E.	1925	*Marshfield Hills*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
McBride, Lloyd L.	E. E.	1925	*Lubec, Me.*
McCarthy, Louis B.	C. E.	1925	*Newton*
McCarthy, Robert E.	E. E.	1925	*Natick*
McCue, Edward L.	E. E.	1925	*Roxbury*
McElhinney, Earle S.	M. E.	1924	*Lynn*
McKenne, Charles D.	M. E.	1923	*Everett*
McKewen, George D.	Ch. E.	1924	*Eastport, Me.*
McManus, John P.	C. E.	1923	*Roxbury*
McNabo, Anthony H.	C. E.	1925	*Bradford*
McQuillan, Arthur J.	E. E.	1925	*Dorchester*
McSweeney, William H.	M. E.	1924	*Salem*
Mahoney, John H.	E. E.	1924	*Salem*
Mailhot, Willrod A.	E. E.	1925	*Somersworth, N. H.*
Malloch, Ernest M.	C. E.	1925	*Eastport, Me.*
Mallorey, Walter B.	E. E.	1925	*Lynn*
Malloy, John W.	M. E.	1924	*Roxbury*
Malm, Herbert A.	A. E.	1924	*Worcester*
Malnate, William F.	C. E.	1924	*Quincy*
Maloney, Edward F.	Ch. E.	1922	*Dorchester*
Mann, J. Ralph	Ch. E.	1925	*Dorchester*
Marcoux, Ernest A.	Ch. E.	1925	*Watertown*
Marcus, Jacob	Ch. E.	1922	*Winthrop*
Marcus, Maurice	C. E.	1922	*Dorchester*
Margeson, Vertrude C.	E. E.	1925	*Everett*
Marsh, Edwin E. R.	E. E.	1925	*Pittsfield*
Marshall, Elmer P.	Ch. E.	1924	*Allston*
Marshall, James P.	E. E.	1923	*Hallowell, Me.*
Martin, Arthur D.	C. E.	1925	*Richford, Vt.*
Martin, B. Malcolm	M. E.	1924	*Swampscott*
Martin, Herbert S.	Ch. E.	1925	*Somerville*
Martinelli, Henry C.	M. E.	1924	*Springfield*
Mason, Charles F.	E. E.	1924	*Pownal, Vt.*
Maurette, Rene G.	E. E.	1925	*Medford*
Maxwell, George W.	E. E.	1925	*Melrose*
Maxwell, Sherman O.	A. E.	1925	*Somerville*
May, Charles A.	C. E.	1924	*Fairhaven, Vt.*
Meade, William H., Jr.	E. E.	1923	*Peabody*
Meagher, John J.	C. E.	1922	*E. Chelmsford*
Merrill, Louis F.	A. E.	1925	*Wollaston*
Meserve, George H., Jr.	C. E.	1925	*Medford*
Messier, Joseph A.	E. E.	1924	*Quincy*
Miller, Merton W.	Ch. E.	1925	*Waltham*
Milne, David C.	C. E.	1923	*Hackensack, N. J.*
Mitchell, I. Earle	E. E.	1925	*Wallingford, Conn.*
Molliver, Henry	E. E.	1925	*Chelsea*
Moody, Donald C.	M. E.	1923	*Bradford*
Moore, Charles K.	C E.	1924	*Fall River*
Morgan, Frederick N.	Ch. E.	1924	*Everett*
Morgan, Harold E.	A. E.	1925	*Lawrence*
Morgan, Merrill R.	E. E.	1925	*Lubec, Me.*
Morgan, Stuart H.	Ch. E.	1922	*Medford*
Morrell, Stanley	E. E.	1923	*Peabody*
Morris, Joseph A.	E. E.	1924	*New Britain, Conn.*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Morse, Howard W.	E. E.	1925	*Lynn*
Mower, C. Thomas	Ch. E.	1924	*Malden*
Murphy, Charles L.	C. E.	1924	*Worcester*
Murphy, Nelson L.	C. E.	1925	*Waltham*
Navisky, Moses	Ch. E.	1925	*Boston*
Nelson, Carl H.	A. E.	1925	*Dorchester*
Nelson, Edwin W.	A. E.	1925	*Hartford, Conn.*
Newman, Harry	Ch. E.	1925	*Salem*
Newman, Irving M.	E. E.	1924	*Boston*
Newton, Elmer C.	E. E.	1925	*Raymond, N. H.*
Niechcay, Frank K.	C. E.	1925	*Jamaica Plain*
Nivinski, Alexander A.	C. E.	1925	*Hyde Park*
Noble, Robert A.	E. E.	1923	*Rochester, Vt.*
Nolf, Ralph L.	E. E.	1925	*Webster*
Norberg, Ernest M.	C. E.	1922	*Medford*
Norton, George R.	M. E.	1925	*Avon, Me.*
Noyes, Roswell L.	M. E.	1925	*Newburyport*
Nylin, Carl G.	M. E.	1922	*Worcester*
Nyman, Chester L.	C. E.	1922	*Marlboro*
Oakman, Roger G.	C. E.	1924	*Neponset*
O'Connell, Harold J.	E. E.	1925	*Dorchester*
Ogden, Milton P.	E. E.	1925	*Fall River*
Oliva, John F.	E. E.	1924	*E. Weymouth*
Olson, Roy C.	M. E.	1925	*Squantum*
O'Roak, Ralph D.	M. E.	1925	*Pittsfield, Me.*
O'Sullivan, Cornelius R.	E. E.	1925	*Lawrence*
Overbeck, Royal C.	Ch. E.	1924	*Gloucester*
Oxley, John J.	Ch. E.	1925	*Pawtucket, R. I.*
Oxnard, Edward P.	Ch. E.	1925	*West Medford*
Paige, Herman A.	A. E.	1925	*Dorchester*
Palmer, Reginald W.	C. E.	1925	*Norfolk Downs*
Parad, Emanuel	M. E.	1922	*Boston*
Parker, Albert I.	M. E.	1925	*Melrose*
Parker, Burton C.	C. E.	1925	*Holden*
Parker, Horace R., Jr.	E. E.	1925	*Swampscott*
Parmenter, Richard	C. E.	1925	*Ashland*
Parson, Alfred D.	C. E.	1922	*Melrose*
Parsons, Edward S.	C. E.	1922	*Gloucester*
Parsons, William N.	C. E.	1924	*Gloucester*
Pascoe, Thomas E.	M. E.	1922	*Chocorua, N. H.*
Paulsen, Iver E.	Ch. E.	1923	*Woburn*
Paver, William H.	M. E.	1922	*Franklin*
Pearce, Howard T.	C. E.	1922	*Concord Junction*
Pearson, Carl R.	C. E.	1922	*Winthrop*
Peck, Donald L.	E. E.	1923	*Framingham*
Penniman, John R.	C. E.	1924	*Whitman*
Perkins, Eustace J.	E. E.	1925	*Wenham*
Perley, George T.	E. E.	1924	*Wollaston*
Perry, Alfred L.	M. E.	1924	*Everett*
Perry, Edward J.	M. E.	1923	*Putnam, Conn.*
Perry, Lyndall R.	Ch. E.	1925	*Medford*
Peterson, Andrew M.	Ch. E.	1925	*South Boston*
Peterson, Arthur W.	E. E.	1925	*Wellesley*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Peterson, Clarence W.	M. E.	1923	*Everett*
Peterson, Douglas A.	E. E.	1925	*Brighton*
Peterson, Halvar A.	E. E.	1925	*Waltham*
Philbrick, Albert W.	E. E.	1924	*Kittery, Me.*
Phillips, Howard A.	E. E.	1925	*Petersham*
Phinney, Edward D.	E. E.	1924	*Topsham, Me.*
Pierce, Melvin G.	E. E.	1925	*Arlington*
Pierce, Webster W.	M. E.	1923	*Quincy*
Pinkul, Edward J.	C. E.	1924	*Dorchester*
Pitman, George M.	C. E.	1925	*Salem*
Plante, Elphage E.	E. E.	1925	*Manchaug*
Platt, Charles E.	E. E.	1925	*Medford Hillside*
Plaus, Harley O.	M. E.	1925	*Worthington*
Plunkett, Robert K.	M. E.	1924	*Dorchester*
Proctor, Lloyd V.	E. E.	1925	*So. Weymouth*
Prophet, Alta A.	C. E.	1925	*Clinton*
Poley, Abraham	A. E.	1925	*Boston*
Powell, John R.	M. E.	1925	*Waverly*
Powers, Everett A.	Ch. E.	1925	*Gloucester*
Powers, Fern L. B.	E. E.	1925	*Laconia, N. H.*
Publicover, Lewis E.	E. E.	1924	*Gloucester*
Putnam, Charles H.	M .E.	1924	*Webster*
Quilty, Ralph G.	Ch. E.	1924	*Dorchester*
Quinn, John F.	E. E.	1923	*Salem*
Rabinowitz, Louis	E. E.	1924	*Roxbury*
Ravden, Sydney	Ch. E.	1925	*Dorchester*
Ravreby, Abraham A.	Ch. E.	1925	*Boston*
Read, Alden W.	E. E.	1924	*Bridgewater*
Read, Herbert C.	Ch. E.	1925	*Springfield*
Reed, Kenneth D.	A. E.	1925	*Winthrop*
Reed, Linwood L.	M. E.	1923	*Everett*
Reed, Miller G.	E. E.	1924	*Boothbay Harbor, Me.*
Reed, Robert F.	E. E.	1923	*Granville Ferry, N. S.*
Reilly, Rupert M.	M. E.	1925	*Bristol, Me.*
Reuther, Willard E.	E. E.	1925	*Jefferson*
Rhoades, Clifford T.	C. E.	1922	*Bridgewater*
Riccio, Angelo P.	M. E.	1925	*Watertown*
Rich, Luke A.	Ch. E.	1923	*Newton*
Rich, Roy D.	A. E.	1925	*Athol*
Richard, Irenee T.	M. E.	1924	*Salem*
Richards, Charles N.	C. E.	1925	*Milton*
Rideout, Edward H.	Ch. E.	1925	*West Somerville*
Riggio, Samuel A.	C. E.	1924	*Ivoryton, Conn.*
Ripley, Franklin L.	Ch. E.	1925	*W. Stewartstown, N. H.*
Roach, Harold N.	A. E.	1925	*N. Gloucester, Me.*
Robbins, Bertrand B.	E. E.	1922	*Elmwood*
Roberts, Frank	Ch. E.	1925	*Everett*
Roberts, George I.	E. E.	1924	*E. Weymouth*
Roberts, Ulysses K.	E. E.	1925	*Berwick, Me.*
Robinson, William J.	Ch. E.	1923	*Pawtucket, R. I.*
Roby, Wilbur	E. E.	1925	*Arlington*
Rogers, Allan H.	E. E.	1924	*Jonesport, Me.*
Rommer, George J.	A. E.	1925	*Dorchester*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Rood, Clarence B.	C. E.	1925	*West Medford*
Root, Burritt A.	M. E.	1923	*New Britain, Conn.*
Rosen, Philip	Ch. E.	1922	*Boston*
Rosenblatt, Irving I.	C. E.	1922	*Saxonville*
Rubin, Benjamin	C. E.	1923	*Roxbury*
Rubin, Morris	C. E.	1925	*Roxbury*
Rundlett, John C.	C. E.	1924	*Newburyport*
Russell, Charles C.	E. E.	1923	*Exeter, N. H.*
Russell, John B.	C. E.	1924	*Quincy*
Sampson, Edward N.	E. E.	1922	*Quincy*
Sanborn, Frank D.	M. E.	1924	*Springfield, Vt.*
Sanborn, George H.	M. E.	1924	*Springfield, Vt.*
Sanderson, Albert E.	C. E.	1925	*Waltham*
Savignac, Alphonse L.	C. E.	1923	*Amesbury*
Savikoski, George V.	Ch. E.	1925	*Maynard*
Sawtell, Raymond I.	E. E.	1924	*Shrewsbury*
Sawyer, Russell D.	M. E.	1925	*Concord*
Schaller, Irving R.	E. E.	1924	*Salem*
Schneider, Arthur E.	Ch. E.	1925	*Meriden, Conn.*
Schofield, Clifford L.	Ch. E.	1925	*Maynard*
Schwartz, Joseph P.	C. E.	1923	*Revere*
Seaman, Walter R.	A. E.	1925	*Roxbury*
Secord, Harold W. M.	E. E.	1923	*Newton*
Semenyna, Waldimir	C. E.	1924	*Boston*
Shailer, Fisk A.	M. E.	1924	*Chester, Conn.*
Shapiro, David	C. E.	1925	*Fall River*
Sharples, Oswald	E. E.	1925	*Waltham*
Shaw, J. Arnold	Ch. E.	1924	*Danvers*
Shaw, Richard C.	M. E.	1923	*E. Bridgewater*
Shea, Albert L.	A. E.	1925	*Rumford, Me.*
Shenk, Norman A.	C. E.	1925	*Medford*
Shepard, Chester D.	A. E.	1925	*Everett*
Shields, Francis R.	E. E.	1925	*Malden*
Shopneck, Henry P.	Ch. E.	1922	*Boston*
Short, B. James	E. E.	1925	*Boston*
Short, Randolph	E. E.	1925	*Newburyport*
Shumavonian, Sorun P.	C. E.	1924	*Dorchester*
Shumway, Herbert L.	M. E.	1923	*Mattapan*
Sibley, Clifton A.	A. E.	1925	*Salem*
Silverman, Morris	M. E.	1924	*Quincy*
Siselsky, Morris	E. E.	1925	*Boston*
Sisson, Rollo H.	E. E.	1925	*E. Providence*
Slobin, Harold M.	C. E.	1925	*Worcester*
Small, Howard H.	A. E.	1925	*New Gloucester, Me.*
Smethurst, Raymond	C. E.	1925	*Hopedale*
Smiley, Kenneth	Ch. E.	1925	*Skowhegan, Me.*
Smith, Benjamin L.	E. E.	1923	*Concord*
Smith, Farnham W.	Ch. E.	1923	*Concord*
Smith, Robert B.	A. E.	1924	*Leominster*
Smith, Thomas J.	E. E.	1925	*Medford*
Somes, John J.	M. E.	1924	*Gloucester*
Sondberg, Thomas	Ch. E.	1925	*York Village, Me.*
Souther, George H.	M. E.	1924	*Winthrop*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Southworth, Burton	E. E.	1924	*W. Stoughton*
Soutter, Earle H.	E. E.	1925	*Charlestown*
Spaulding, Harold L.	E. E.	1925	*Sharon*
Spaulding, Howard P.	A. E.	1925	*W. Stoughton*
Spear, Chester M.	M. E.	1925	*Brockton*
Sperl, Warren	Ch. E.	1922	*Auburndale*
Spiegel, Maurice	Ch. E.	1925	*Malden*
Spofford, Frank J.	E. E.	1925	*Haverhill*
Stanetsky, Louis	Ch. E.	1925	*Everett*
Stanton, Fred P., Jr.	E. E.	1924	*Wenham*
Staples, Arthur C.	E. E.	1924	*Segreganset*
Stearns, Elton O.	C. E.	1924	*Waltham*
Steere, Harry W.	E. E.	1925	*Amesbury*
Stenquist, Edward H.	M. E.	1924	*Worcester*
Stephenson, William G.	C. E.	1925	*Needham*
Stern, Frederick P.	C. E.	1925	*Somerville*
Stevens, Charles N.	E. E.	1925	*Mattapan*
Stevens, Thomas A.	E. E.	1923	*Deep River, Conn.*
Stimson, Glen H.	M. E.	1924	*Athol*
Stockwell, Phillip J.	E. E.	1925	*Reading*
Story, Clinton R.	A. E.	1925	*Salem*
Stotz, Herman C.	C. E.	1924	*Brighton*
Stratton, Aubrey E.	C. E.	1925	*W. Townsend, Vt.*
Strong, John S.	M. E.	1924	*Winthrop*
Studler, Morris	C. E.	1925	*Boston*
Sullivan, George E.	E. E.	1925	*Beverly*
Sullivan, John J.	E. E.	1922	*Holyoke*
Sullivan, William H.	M. E.	1922	*Salem*
Swanson, Gustaf	Ch. E.	1923	*Proctor, Vt.*
Swanson, Wallace C.	M. E.	1924	*Lynn*
Swasey, Richard L.	E. E.	1925	*Waterbury, Vt.*
Sweetland, William F., Jr.	E. E.	1924	*Providence, R. I.*
Swetzoff, Benjamin N.	E. E.	1925	*Roxbury*
Swift, Ralph E.	M. E.	1925	*Longmeadow*
Tarplin, Emanuel	Ch. E.	1923	*Lynn*
Taylor, A. Pirrie	M. E.	1924	*Dorchester*
Taylor, Leslie I.	C. E.	1925	*Hartford, Conn.*
Taylor, Robert N.	Ch. E.	1924	*Watertown*
Tebbetts, Eugene L.	Ch. E.	1925	*Holliston*
Tellier, Chester L.	Ch. E.	1925	*Braintree*
Theriault, Joseph E.	C. E.	1925	*Newton*
Thomas, Raymond I.	E. E.	1925	*Milford*
Thompson, Alan M.	C. E.	1923	*Roslindale*
Thompson, George B. S.	E. E.	1925	*Willimantic, Conn.*
Thompson, George M.	E. E.	1925	*Norwood*
Thompson, Harold C.	C. E.	1923	*Bridgewater*
Thompson, Herbert L.	Ch. E.	1923	*Norwood*
Thomson, Claude W. R.	M. E.	1924	*Holyoke*
Thomson, Earl H.	M. E.	1925	*Boston*
Thurston, George T.	A. E.	1925	*Fall River*
Tibbetts, Roger M.	E. E.	1925	*Newcastle, Me.*
Tisdale, Donald C.	E. E.	1925	*Norwell*
Titcomb, Oliver S.	M. E.	1924	*Somerville*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Toas, Norman H.	Ch. E.	1925	*Boston*
Todd, Floyd E.	M. E.	1925	*York, Me.*
Toole, Cameron S.	C. E.	1922	*Clinton*
Toole, Harold J.	A. E.	1925	*Clinton*
Topalian, Asadore	E. E.	1923	*Brighton*
Topalian, Stephen P.	C. E.	1925	*Boston*
Torrey, Joseph H.	M. E.	1925	*Bath, Me.*
Travis, Robert E.	M. E.	1922	*Framingham*
Tucker, Nathan	C. E.	1925	*Dorchester*
Tucker, Newton E.	Ch. E.	1925	*New Britain, Conn.*
Tukey, Egbert O.	———	1925	*Pemaquid, Me.*
Tulloch, Douglas F.	E. E.	1924	*Bridgewater*
Turner, Burton G.	C. E.	1922	*Eastport, Me.*
Ulmer, Donald J.	E. E.	1924	*Norton*
Urquhart, James W.	C. E.	1925	*Waltham*
Vandenkerckhoven, William	E. E.	1924	*Bethel, Me.*
Veale, Louis V.	A. E.	1925	*Barre, Vt.*
Vigdor, Irving A.	E. E.	1924	*Dorchester*
Vincent, George D.	C. E.	1924	*Watertown*
Vines, Frederick D. L.	E. E.	1924	*Greenbush*
Visnick, Alexander	A. E.	1925	*Mattapan*
Vodoklys, Frank V.	Ch. E.	1925	*Maynard*
Wade, Edward A.	E. E.	1924	*Jamaica Plain*
Waldron, F. Elliott	E. E.	1924	*Gloucester*
Walker, Lawrence D.	Ch. E.	1924	*Watertown*
Waller, Frederick M.	M. E.	1925	*Gaylordsville, Conn.*
Waller, Ivan R.	A. E.	1925	*Milton*
Warner, David G.	M. E.	1924	*Sterling*
Warner, W. Darrington	E. E.	1924	*Newburyport*
Watson, Francis	M. E.	1925	*Jamaica Plain*
Waugh, Leslie W.	C. E.	1925	*East Boston*
Way, Alexander B., Jr.	M. E.	1925	*Reading*
Weiner, Mitchell	E. E.	1925	*Roxbury*
Wentworth, Clarence S.	M. E.	1922	*Revere*
Weschrob, Charles W.	M. E.	1925	*Dedham*
Weston, Philip O.	E. E.	1924	*Mattapan*
Wetmore, George H.	E. E.	1924	*Peabody*
Wheeler, Clifford E.	Ch. E.	1922	*Malden*
Wheeler, Harold W.	Ch. E.	1924	*Winthrop*
White, Albert	Ch. E.	1925	*Mattapan*
White, Earl M.	E. E.	1925	*Abington*
White, George W.	A. E.	1925	*E. Woodstock, Conn.*
White, William C.	E. E.	1925	*Dorchester*
Whitehead, Arthur F.	C. E.	1925	*Atlantic*
Whiting, Raymond C.	M. E.	1925	*Upton*
Whitney, Stanley Y.	E. E.	1925	*Medford*
Whiton, Wilson	M. E.	1923	*Hingham*
Wickerson, Clarence R.	C. E.	1925	*Eastport, Me.*
Wilcox, Arthur L.	C. E.	1924	*Maynard*
Wilcox, Vaughan L.	A. E.	1925	*Mars Hill, Me.*
Willey, Laurence V.	C. E.	1924	*Skowhegan, Me.*
Williams, Charles I.	M. E.	1922	*Quincy*
Williams, Clifton S.	E. E.	1925	*Hartford, Conn.*

NAME	DEPARTMENT	YEAR	HOME ADDRESS
Williams, Edwin C.	C. E.	1922	*Natick*
Willis, Howard A.	Ch. E.	1923	*Melrose Highlands*
Wilson, David C.	M. E.	1925	*South Norwalk, Conn.*
Wineblatt, Michael	E. E.	1924	*Salem*
Winslow, Francis G.	A. E.	1925	*South Hanover*
Winslow, Lawrence A.	E. E.	1925	*Watertown*
Witherell, Eugene E.	M. E.	1925	*Rehoboth*
Witherell, Roger	C. E.	1925	*Taunton*
Wood, Manson E.	E. E.	1923	*Wakefield*
Wooding, George S.	C. E.	1925	*Wallingford, Conn.*
Woodworth, Ernest H.	E. E.	1925	*Newton*
Works, Herbert F.	E. E.	1925	*Marlboro*
Wright, Moses E., Jr.	E. E.	1922	*Newburyport*
Wright, Maurice H.	Ch. E.	1924	*Springfield*
Wylde, Carlton T.	C. E.	1925	*North Adams*
Wyner, Henry I.	A. E.	1925	*Allerton*
Young, Claude	M. E.	1924	*Quincy*
Young, George F., Jr.	E. E.	1925	*Somerville*
Young, Herbert M.	Ch. E.	1925	*Maynard*
Young, Horace B.	M. E.	1923	*Atlantic*
Young, Kenneth C.	E. E.	1925	*Portsmouth, N. H.*
Young, Walter H.	E. E.	1924	*Matinicus, Me.*
Young, Wilfred A.	E. E.	1923	*Baltic, Conn.*
Zak, Alexander M.	C. E.	1925	*Boston*
Ziegler, George L.	M. E.	1925	*Concord Junction*
Ziegler, Theodore W.	M. E.	1925	*East Lynn*
Ziegra, Albert G.	Ch. E.	1924	*Deep River, Conn.*

INDEX

Absences 48
Acceptance of Applicants 38
Administration of School 13
Administrative Engineering 64, 104
Admission 35
Admission Fee 36
Advanced Standing 46
Advisors 49
Age of Applicants 35
Algebra 37
Application Blank 127
Assistants 12
Athletics 27, 50, 53
Attendance 41, 48
Awards 52
Birth Certificates 37
Board of Governors 8
Books and Supplies 45
Calendar 2
Candidates for Degrees 47
Certificates 35, 37
Chemical Engineering 62
Chemical Laboratory 25
Civil Engineering 56, 78, 98
Civil Engineering Equipment 23
Clubs 50
Committees of the Faculty 15
Conditions 46, 47
Conduct 49
Co-operating Firms 28, 32
Cost of Supplies 45
Course of Instruction 66, 107
- Administrative Engineering 104
- Chemical Engineering 98
- Civil Engineering 98
- Drawing 73
- Electrical Engineering 91
- English 68
- General Engineering 75
- Liberal Subjects 68
- Mathematics 69
- Mechanical Engineering 85
- Physics 71

Curriculums 41, 55
Cuts 48
Degrees 17, 47, 53
Department of School 14
Deposits, Laboratory 43
Discipline 49
Drafting Equipment 26
Drawing 73
Earnings 30
Education Certificates 37
Electrical Engineering 60, 91
Electrical Engineering Laboratory 24
Electrical Measurements Laboratory 24
Electives 45
Engineering, Administrative 64
Engineering, Chemical 62
Engineering, Civil 56
Engineering, Electrical 60
Engineering, Mechanical 58
Engineering Practice 3, 19, 27, 41
Engineering Societies 51
Enrollment 111
Entrance Certificates 35
Entrance Examinations 38
Entrance Requirements 35
Entrance Subjects 37
Equipment 23
Examinations 38, 46
Executive Council 9
Faculty 10
Faculty Committee 15
Fees 36, 41, 43, 44, 46, 54
Four-Year Courses 41
Fraternities 52
Full-Time Students 42

General Departments 14, 68
General Engineering 75
General Information 17
Geometry 37
Grades 47
Graduates 54
Graduation 53
Gymnasium 27
High Schools 19
History of School 17
Holidays 2
Hours of School 41
Instructing Staff 10
Instruction 66, 107
Interviews 36
Jobs 28
Laboratory, Chemical 25
Laboratory Deposits and Fees 43
Laboratory, Electrical 24
Laboratory, Mechanical 23
Laboratory, Physics 26
Lecturers, Special 6
Liberal Subjects 68
Libraries 26
Living Expenses 39
Location of School 39
Marks 48
Mass Meetings 48
Mathematics 69
Mechanical Engineering 58, 85
Mechanical Engineering Laboratory 23
Musical Clubs 50
Object of School 18
Officers of School 9, 13
Operation of School 19
Pay 30
Payments 42, 44
Physical Training 27, 77
Physics 71
Physics Laboratory 26
Plan of School 19
Positions 28, 54
Practical Work 29, 46
Preparatory Schools 20, 38
Prizes 52
Probation 38, 46
Professional Departments 14
Professors 10
Publications 50
Refunds 44
Requirements for Admission 35
Requirements for Graduation 53
Register of Students 111
Registration 36
Reports of Standing 48
Residence 39
Scholarship 47
School Year 41
Semesters 41
Sessions of School 2
Societies 50
Sports 50
Student Activities 50
Student Activities Fee 37, 44
Student Activities Room 50
Students, List of 111
Students, Special 35, 40
Students, Status of 45
Students, Transferring from Other Colleges 46
Studies 55
Subjects for Entrance 37
Subjects of Instruction 66, 108
Supplies 45
Thesis 53, 76, 109
Tuition 36, 41
Vacation 40, 29, 41
Work, Practical 28
Work, Schedules 3, 30
Year Book 51

NORTHEASTERN COLLEGE
SCHOOL OF ENGINEERING

Boston, Mass., ...192

To the Dean:

Name in full .....

hereby respectfully applies for admission to the.....
Engineering Curriculum of the School of Engineering for the school year 19 –19 , *and submits the following data:*

Residence ..... *Street*

Town .....

State ..... *Tel.* .....

Date of Birth .....*Age* .....

Parent (father's) Name .....

" " *Address* .....

Graduate of.....*High School. Year*.....

Location of High School.....

If not a graduate, how many years were you in High School?.....

When did you leave? .....

Why did you leave? .....

Name of Principal.....

If employed since graduation, what is the name of your employer? .....

Employer's address .....

Names and addresses of two other persons, not clergymen, to whom we may direct inquiries concerning you. (Give former employers' if possible.)

.....

.....

.....

If admitted to the school, do you plan to complete the full four years' curriculum and qualify for the degree?.....

Do you wish the School to place you at Engineering Practice? ....

When do you wish to start Engineering Practice? .....

Have you a position which you wish to retain in co-operation with the School? .....

Where will you live during the school-year? .....

Weight ..... *Height* .....

Have you any physical infirmities? .....

Is your general health good, fair, or poor? .....

Additional Remarks:

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NORTHEASTERN COLLEGE

AND AFFILIATED SCHOOLS

DAY SCHOOL

SCHOOL OF ENGINEERING

Four-year courses in Civil, Mechanical, Electrical, Chemical, and Administrative Engineering leading to the degrees of Bachelor of Civil, Mechanical, Electrical, and Chemical Engineering: B.C.E., B.M.E., etc. The school is conducted in co-operation with engineering firms. Students earn while learning. Open to high-school graduates.

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A school offering three-year courses in Civil, Mechanical, Electrical, Chemical, Structural, Industrial, and Automotive Engineering, leading to a diploma. The school trains men for positions of trust and responsibility.

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A school offering short, intensive courses of a special nature to men whose time is limited. Courses include: Public Speaking for Business Men, Salesmanship, Foremanship, Home Building, Real Estate, Investments, etc.

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For further information concerning any of the above schools, address

NORTHEASTERN COLLEGE

316 Huntington Avenue, Boston 17, Massachusetts
or nearest division or branch

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